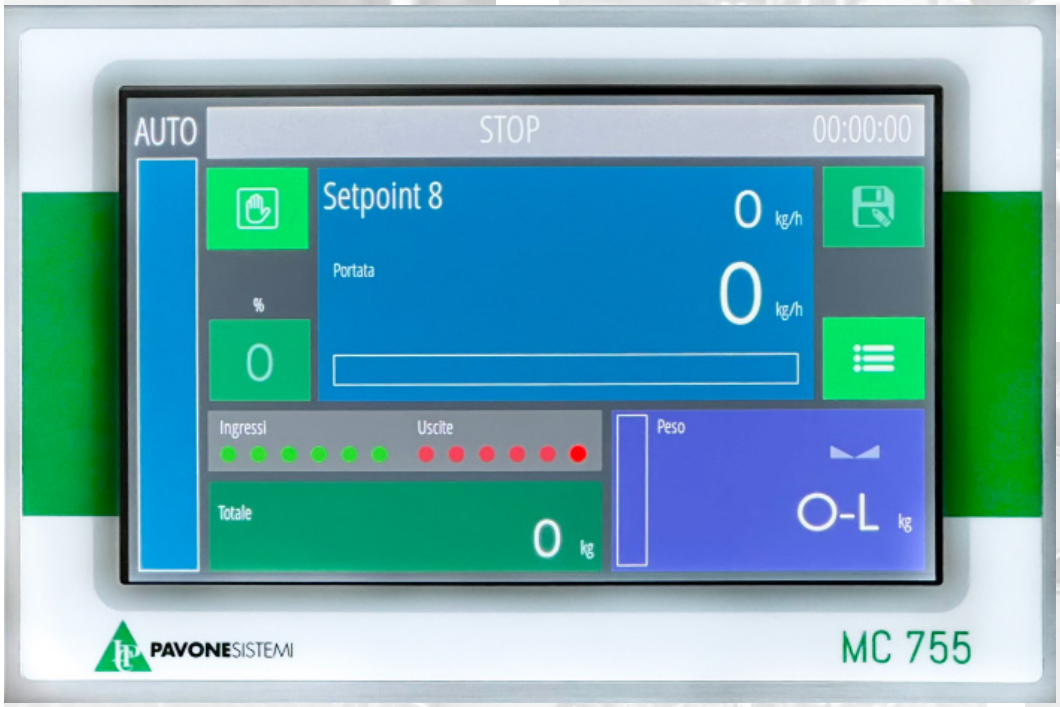
TECHNICAL MANUAL



MC 755 Loss-in-weight flow regulator

Software version 400.01

SYMBOLS

Following are the symbols used throughout the manual to call reader's attention:

	Warning! Electrical Shock Risk.
	Warning! This operation shall be carried out by qualified staff.
	Pay special attention to the following points.
	Further details.

WARNINGS

- This manual provides texts and pictures to inform the operator about all prescriptions and criteria necessary for installing and using this instrument.

- The equipment shall be installed only by qualified personnel that must have read this manual. With the expression "qualified personnel" is meant the personnel that has been trained and thus expressly authorised to carry out the installation by the person in charge for the system safety.

- Power the instrument with a voltage value within the limits specified in the features.

- The user must make sure that the installation is carried out in compliance with the relevant rules in force.

- Please contact the nearest Assistance Centre for every fault you find. Any attempt of disassembly or change that has not been previously authorised will null and void the warranty and will release the Manufacturer from any responsibility.

- The purchased instrument has been designed and produced to be used in the weighing and metering processes thus any improper use will release the Manufacturer from any responsibility.

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EU DECLARATION OF CONFORMITY (DOC)

We

Pavone Sistemi S.r.l.

Via Tiberio Bianchi, 11/13/15

20863 Concorezzo, MB

declare that the DoC issued under our sole responsibility and belongs to the following product:

Apparatus model/Product:	MC755
Type:	Weighing instrument

The object of the declaration described above used as indicated in the installation manual and use, is in conformity with the relevant Union harmonisation legislation:

Directive EMC 2014/30/EU Electromagnetic Compatibility

The following harmonized standards and technical specification have been applied:

EN 61000-6-2:2005

EN 61000-6-3:2007 + A1 2011

Directive LVD 2014/35/EU Low Voltage Directive

The following harmonized standards and technical specification have been applied:

EN 61010-1:2011

Signed for end on behalf of:

Concorezzo: 16/01/2017

Di Reda Donato - Manager

1 - INTRODUCTION

The MC755 can operate as follows according to its setup:

FLOW RATE TRANSMITTER

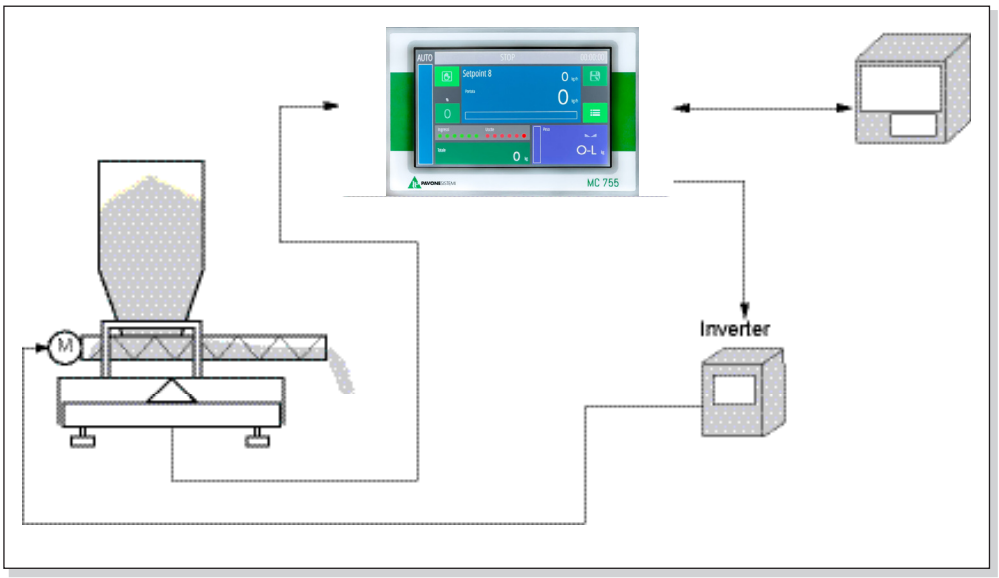
Thanks to the weight decrease (load cells), when the instrument receives the run input, it calculates an instantaneous flow rate which is then transmitted externally through a configurable analog output (0-10 V, 0-5 V, 0-20 mA, 4-20 mA).

It is also possible to receive the following outputs:

- weight totalization output;
- preset output;
- conveyed total set output;
- out of tolerance flow rate alarm output;
- serial communication protocol RS422/485/232, optional ETHERNET;
- generic alarm output;
- feeding request output;
- USB device communication port;
- optional USB HOST port with USB pen drive interface.

FLOW RATE CONTROLLER

The MC353 control unit is configured with P.I. regulator and allows you to automatically adjust the flow rate in a decreasing weight system.



The picture shows how the instrument controls the system adjustment ring.

During the metering process, the instrument measures the instantaneous flow rate every second, by calculating the decrease of weight according to that unit of time. Based on this value, it calculates the flow rate per hour, that is how much the system would meter per hour if the extractor would operate at the same speed and the decrease of weight would be constant.

You can set by keyboard or select by external contacts up to 15 values of desired flow rate.

The instrument will increase or decrease the value of the analog output, thusthe extraction speed, to reach the instantaneous flow rate value set in the selected Setpoint. During the metering process, if the existing product goes below the specified minimum level, the instrument automatically feeds the weighing belt to the specified maximum level. During the feeding process, no adjustment is made and the last calculated flow rate is displayed.

The extraction speed can be also set manually by increasing or decreasing the analog output value by keyboard. In this case the instrument does not make any adjustment but simply displays the measured flow rate (manual operation).

The MC353 control unit has the following features:

- Weight totalization output;
- Conveyed weight total preset and set output;
- Generic alarm output;
- Flow rate out of tolerance alarm output;
- Flow rate output equal to 0;
- Retroaction analogue output (0-10V;0-5V, 0-20 mA; 4-20 mA);
- Inputs for the selection of 15 preset set points;
- Refill input;
- Selection of the instrument state from manual to automatic and vice versa by means of the touch screen, through external contact, and by means of serial communication protocol.

ON BOARD INSTALLABLE OPTIONS:

A - Second analogue output;

B - Analogue input for flow setting

C- USB HOST

D- ETHERNET TCP/IP, UDP, ARP, ICMP, ModBus/TCP interface;

E- PROFINET IO, ETHERNET I/P Interface.

EXTERNAL MODULES BASED INSTALLABLE OPTIONS:

1- Module external relays MOD-RELE' (4IN - 8 OUT);

2- Repeater display;;

3- Thermal printer.

1.1 - OTHER FUNCTION OF MC755

MASTER-SLAVE OPERATION

The instrument may operate as slave, in this case Set Point may vary through an analogue (0-10V / 4-20mA / 0-20mA) or digital (RS485) input.

Flow rate Set Point will adjourn proportionally to the current input.

Input full scale (100%) corresponds to the active Set Point value on the instrument.

If actual Set Point value is zero (0), then instrument acquires as full scale value the parameter of maximum flow rate of the system.

When the instrument operates as “master”, instantaneous flow rate readings are transmitted through the (optional) analogue output or through the digital RS485 com port in order to connect the “master” instrument to “slave” instruments.

PARAMETERS THAT CAN BE SET

Operation parameter setting can be carried out through the touch-screen user interface. Parameters are organised on 3 menu levels with independent access criteria.

All parameters that can be set are listed in a table and clearly identified with a numeric code (address). The read and write access to parameters is available through the communication port with supervisor (RS422 / RS 232/ RS485 / optional Ethernet) via the ModBus RTU protocol.

For operation details see the relevant paragraphs.

DATA IMPORT / EXPORT

If the instrument is provided with a USB Host option, you can import/export the above-mentioned files directly through a USB pen drive.

The instrument is equipped with USB Host.

1.2 - TECHNICAL CHARACTERISTICS

STRUCTURAL FEATURES

Front panel	Made of aluminium with polycarbonate screen Protection class: IP 65 Overall dimensions: 202 mm x 134 mm (l x h)
Assembly	Built-in panel front. Drilling template 190 mm x 117 mm (l x h) Fixing by means of 4 metallic threaded rods 3 mm rubber seal along all perimeter
Rear panel	Aluminum cover Overall dimensions:188 mm x 115 mm (l x h) 50 mm pitch screw terminal board
Connections	Removable screw terminal blocks pitch 5.08 Standard USB (Host/Device) connectors Standard RJ45 Ethernet connector

POWER SUPPLY

Power supply	10÷30 Vdc
Max. absorption	10W max isolata
Installation category	Cat. II
Temperatures	Operation: -10 °C ÷ + 40 °C (85% humidity without condensate) Storage: -20 °C ÷ + 70 °C

DISPLAY

Display	LCD TFT 7" color backlit 800 x 480 pixels. Visual area size 152 x 92 mm
Touch screen	Resistive touch panel integrated in the LCD, with sound feedback (buzzer)

LOAD CELLS INPUT

No. of channels	1 input channels for load cells.
Cells supply	5 Vdc 240 mA (max 16 cells of 350 ohm), Protected against short circuit.
Input sensitivity	0.02 microV min
Linearity	< 0.01% of the scale end
Temperature warmup drift	< 0.001% of the scale end / °C
Internal resolution	Over 16 000.000
Weight resolution	100.000 appear
Measure field	7.8 mV/V bipolar
Acquisition frequency	From 50 Hz
Digital filter	Adjustable from 0.2Hz to 50Hz

ANALOGUE I/O

No. of channels	2 opto-isolated analogue outputs (0-10 V / 4- 20 mA - 2° optional output) analogue input (0-10 V / 4- 20 mA optional)
Resolution	Analogue output: 16 bit Analogue input: 16 bit
Measure field	Outputs: voltage 0÷5V, 0÷10V, current 0÷20mA, 4÷20mA Input: 0÷5V, 0÷10V, 4÷20mA
Output impedance	Voltage: 10KOhm min, current 300Ohm max
Output linearity	0.05% of the scale end
Drift temperature	0.005% of the scale end / °C

LOGIC I/O

No. of channels	6 opto-isolated logic outputs (clean contact on board max 30 Vdc, 0.1A) 6 iopto-isolated logic inputs on board (7.5 - 24 Vdc PNP)
Output power	30 Vdc max / 60 mA cad.
Input voltage	12 ÷ 24Vdc (external supply)
Additional I/O	Up to 4 external modules with 4 in. / 8 out. each (16 in. / 32 out. in total)

COMMUNICATION PORTS

No. of channels	4 independent communication ports (non-switched)
COM1 interfaces	RS232
COM2 interfaces	RS232
COM3 interfaces	RS485
Interfacce COM4	RS485
Wire length	15 m (RS232), 1000 m (RS485)
Baud rates	From 1200 m to 115200 bit/sec
Ethernet protocols	LAN
USB Host	USB interface pen drive
DP Profibus (optional)	Profinet - Ethernet IP

CPU

Micro-controller	ARM Cortex M7 @ 280 MHz with 1 MB RAM and 2 MB FLASH integrated
Code memory	Code ROM memory up to 4 MB
Data memory	FLASH up to 4 MB
Clock / calendar	Integrated with lithium battery

CONFORMITA NORMATIVE

Normative	EN61000-6-2, EN61000-6-3, EN61010-1

2 - MC755 INSTALLATION

2.1 - INSTALLATION WARNINGS AND INDICATIONS

Upon installation it is necessary to arrange after and near the equipment a main switch for an omnipolar cut-off with contact minimum opening of 3 mm.

For cleaning the instrument make use of a cloth slightly soaked in pure alcohol for both the container and the display.

During the cleaning the instrument must be OFF.

Environmental pollution level: 2

2.2 - INSTRUMENT ASSEMBLY

- Only qualified personnel shall carry out the following procedures.

- All connections shall be made with instrument OFF.

The instrument shall be assembled in an opening with a 188 x 117 mm drilling template and shall be fixed by means of the 4 threaded tie rods supplied together with the instrument.

- Consider that the instrument depth with extractable terminal blocks fitted is of 50 mm, and it is necessary to keep place enough for all connections.

- Do not install the instrument near power equipment (motors, inverters, contactors, etc.) or any equipment non-conforming with the Electromagnetic Compatibility EC Standards.

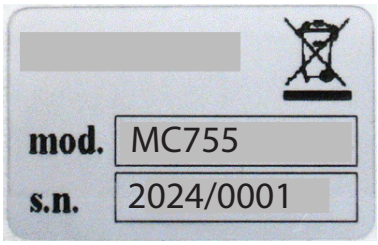
- The load cells connection cable shall have a maximum length of 140 m/mm$^{2.}$

-The RS232 serial line shall have a maximum length of 15 meters (EIA RS-232-C Standards).

- All warnings concerning all peripheral devices connections shall be duly followed.

The installation environment can be subject to strong magnetic fields and electric interferences due to present machinery; it is thus recommended to take all precautions so as to prevent them from affecting the typical signals of a precision electronic equipment (filters on remote control switches, diodes on 24 Vdc relays, etc.)

2.3 - INSTRUMENT IDENTIFICATION PLATE



In case of information or indications request concerning the instrument it is important to report such data along with the programme number and version that are printed on the manual cover and displayed upon instrument switching-on.

2.4 - WARNINGS FOR THE INSTALLATION OF LOAD CELLS AND MICROPROCESSOR SYSTEMS

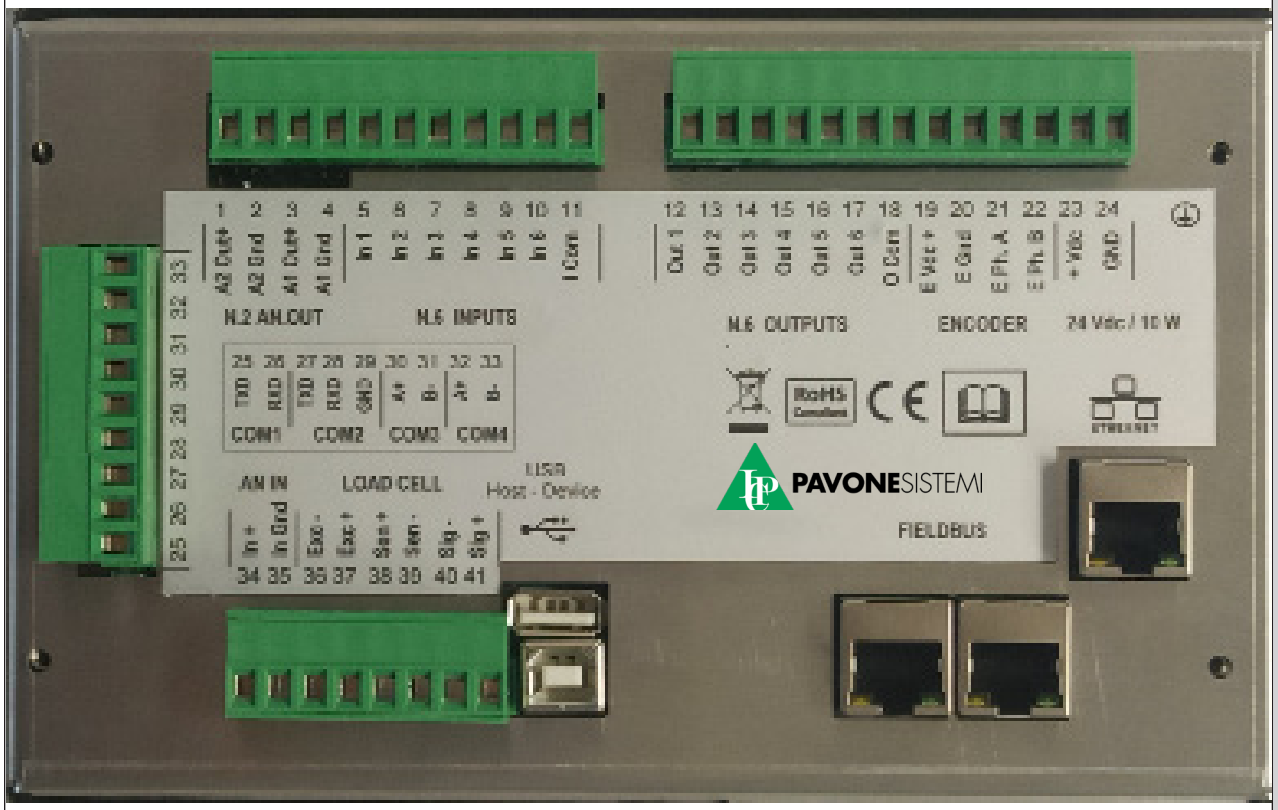
1. Do not carry out weldings with load cells fitted.
2. Use a copper conductor to connect the load upper support plate with the lower one, then connect both upper plates with the earth line.
3. Use watertight fittings and sheaths to protect the cells wires.
4. Use a watertight connection box and a terminal board with cable clamp to connect the cells in parallel.
5. All "shielded" cables for signal amplifiers or cells connection extensions shall be inserted alone in the cable conduit or in a tube as far away as possible from the power cables.
6. The amplifier or cells cable shall be inserted in the panel from one side or the other and it should be connected directly to the instrument terminal block without being interrupted by additional terminal blocks or passing through cable conduits with other wires.
7. Use "RC" filters on the coils of remote control switches and the solenoid valves controlled by the micro-processor.
8. In case of condensate inside the equipment it is recommended to always keep them powered.
9. The electric panel installer shall provide all instrument electric protections (fuses, door lock switch, etc.).
10. It is recommended to connect the instrument casing to the earth conductor (possibility to use the control unit fixing screws).

2.5 - ELECTRIC CONNECTIONS

Only qualified personnel shall carry out the procedures described below. All connections shall be made with instrument OFF.

TERMINAL BLOCKS DIAGRAM

UPPER TERMINAL BLOCK



LOWER TERMINAL BLOCK

SIDE TERMINAL BLOCK

2.6 - LOAD CELL CONNECTION (CONTACTS 1÷6 LOWER TERMINAL BLOCK)

The cell cable shall not be inserted together with other cables (for eg. outputs connected with remote control switches or supply cables), it must be routed in its own path.

Any cable extension connection shall be carefully shielded, respecting the colour code and using the cable type supplied by the manufacturer. The extension connections shall be made through welding or support terminal blocks or connection box supplied as optional.

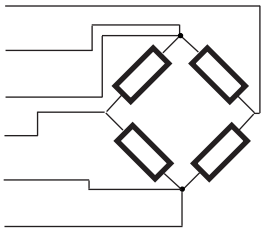
The cell cable shall have a number of conductors not higher than those used (4 or 6). In case of a 4-conductors cable connect the reference wires by making a jumper across the relevant poles of the supply cables.

It is possible to connect up to maximum 8 350 Ohm cells in parallel to the instrument. The cells supply voltage is of 5 Vdc and is protected against temporary short circuit. The instrument measurement field foresees the use of load cells with sensitivity from 1 mV/V to 5 mV/V.

NUM.	Lower terminal block (pitch 5.08 mm)
36	- EXC
37	+ EXC
38	+ Sense
39	- Sense
40	- Signal
41	+ Signal

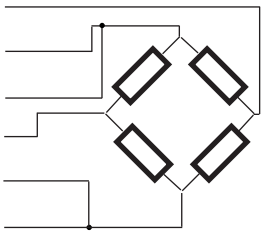
6 WIRES CELL CONNECTION

- Signal
+ EXC
+ Sense
+ Signal
- Sense
- EXC



4 WIRES CELL CONNECTION

- Signal
+ EXC
+ Sense
+ Signal
- Sense
- EXC



Note: to use the 4-wire technique, jumper across terminal 38 and terminal 37, terminal 39 and terminal 36.

The SHIELD of the cell cable must be connected to terminal 24 (GND).

2.7 -LOGIC INPUTS AND OUTPUTS (CONTACTS 5÷18 LOWER TERMINAL BLOCK)

The 6 logic inputs are electrically isolated by the instrument through optoisolators.

The logic inputs connection cables must not be inserted together with power or supply cables and you have to use a cable as short as possible.

The inputs are active when a voltage of 7,5 / 24 Vdc. (PNP logic).

The 6 logic outputs feature a photorelay (clean contact) with a common contact. The capacity of each contact is of 0,1 A / 30Vdc.

NUM.	Lower terminal block (pitch 5.08 mm)
5	IN 1 - Run
6	IN 2 - Man / Aut
7	IN 3 - BCD1
8	IN 4 - BCD2
9	IN 5 - BCD4 / Refill
10	IN 6 - BCD8 / Reset/Print
11	Input common connector

NUM.	Lower terminal block (pitch 5.08 mm)
12	OUT 1 - PreSet
13	OUT 2 - Set
14	OUT 3 - Tot. pulse
15	OUT 4 - General alarm
16	OUT 5 - Flow rate alarm
17	OUT 6 - Recharge request
18	Output common connector

IN1	Run static input. Close this contact to enable instrument begin and maintain programmed operations (weighing, flow regulation, alarms etc.). Input must be kept closed during dosing; open the contact to stop operations.
IN2	Manual selection (open) / automatic (closed). The selection through the touch screen has the priority over the selection of this input. When a selection that does not correspond to the input status is changed through the keyboard, to commutate the selection with this input it is necessary to first set the selection according to what had been done by the keyboard, and then commutate it in the desired position. For example: with the input set to AUTO, it is possible to commutate it to MAN through the keyboard. To restore the automatic operation using the input it is necessary to first set the input to MAN and then to AUTO.
IN3	Bit 1 setpoint selection with BCD coding. The selection appears on the display. When all inputs are open, the system keeps the last selected combination (even if you switch off the instrument).
IN4	Bit 2 setpoint selection with BCD coding. The selection appears on the display. When all inputs are open, the system keeps the last selected combination (even if you switch off the instrument).
IN5	You can select the function of these inputs: if WEIGHING BELT FEEDING is selected, keep the input closed every time the weighing belt is fed during the metering process. When the input is closed, the adjustment remains locked and the hourly flow rate is not calculated. Otherwise you can have the function combined with inputs 3, 4 and 6 for selecting the setpoint with BCD coding (IN5 = bit 4).
IN6	The function of this input can be selected between the input (closed by pulses) can control the metered total reset and print the receipt if the printer is configured. Otherwise, you can have the function combined with inputs 3, 4 e 5 for selecting the setpoint with BCD encoding. (inp.6 = bit 8 if inp.5 = bit 4; inp.6 = bit 4 if inp.5 is selected to control the manual feeding of the weighing belt).

OUT1	Total preset reached. This output is activated when the total transported product exceeds the programmed SET PRESET value. If the programmed value is zero, this output will never be activated. The output is deactivated when the total transported product value is reset.
OUT2	Set total reached. This output is activated when the total transported product exceeds the programmed value, anticipated by the programmed "material in flight" value. If the programmed value is zero, this output will never be activated. The output is deactivated when the total transported product value is reset.
OUT3	Totalization pulses. This output is impulsively activated (50 msec) each time a product quantity equal to the programmed value is transported (max 1 pulse per second).
OUT4	Operation alarm. This output is activated when at least one of the expected alarms occurs. The operating logic is selectable. The output is automatically deactivated when operation returns to normal. The output is active only during running. The output is not activated when the T-out alarm occurs if COM2=OUT_EXT.
OUT5	Out of tolerance instantaneous flow rate alarm. During the belt movement, this output is enabled if the instantaneous flow rate exceeds the specified limit. The output is automatically disabled when the instantaneous flow rate returns within the specified tolerance. The operation logic can be selected. Alarm is active even with flow rate block.
OUT6	Feeding request. The operation of this output depends on the setting of the WEIGHING BELT FEEDING (no. 0161) parameter. If the weighing belt is stopped (IN RUN open) or FEEDING MODE=AUTO, the output closes when the weight decreases below the minimum threshold. In this case, it is not necessary to manage the input where the feeding is under way; this input will open again when the maximum level is reached. If the weighing belt is stopped and the material level is within the MIN and MAX levels, you can operate a feeding. Close the weighing belt feeding input (IN 5) to enable the output, which will be then disabled when the maximum level is reached or when the input (IN 5) opens. During the metering process, the output is enabled when the MIN level is reached, and is then disabled in different ways based on the setting of the FEEDING MODE parameter: • UNIQUE: the output is disabled when the maximum level is reached or when the doser feeding input opens; • MAX LEVEL: the output is disabled only when the max level is reached, the output remains active even when metering is interrupted during feeding.

NOTE: inputs are activated only if activation time exceeds 500 msec.

2.8 - INSTRUMENT POWER SUPPLY (CONTACTS 23-24, LOWER TERMINAL BLOCK)

The instrument is powered through terminals 23 and 24.

The power cable must be routed separately from other cables with different voltages, load cell cables, encoder cables, and logical/analog input/output cables.

NUM.	Lower terminal block (7.5mm pitch)
23	+ 24Vd
24	GND

SUPPLY VOLTAGE: Max isolated 30Vdc

POWER: 10W

NOTE: Ensure that the GND (pin 24) is grounded.

2.9 - USB DEVICE PORT (REAR USB FEMALE CONNECTOR)

Use this communication port to directly interface with a PC via a USB port.

Use a standard USB cable for connection.

2.10 - COM1 - RS232 SERIAL PORT (CONTACTS 25÷29 SIDE TERMINAL BLOCK)

To establish the serial connection, use a shielded cable, ensuring the shield is grounded on one side only. If the cable has more conductors than needed, connect the shield to the unused conductors.

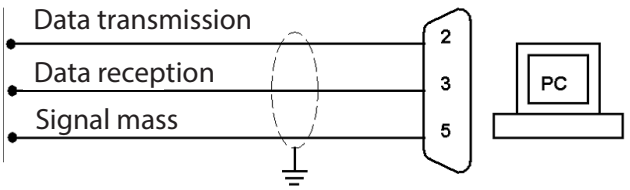
The serial connection cable must have a maximum length of 15 meters (EIA RS-232-C standards), beyond which the RS485 interface provided by the instrument should be used.

The cable must not be routed together with other cables (e.g., outputs connected to remote control units or power supply cables) but should ideally follow its own path.

The PC used for the connection must comply with EN 60950 standards.

Below is the connection diagram with a 9-pin PC connector:

NUM.	Upper terminal block (5.08mm pitch)
25	TX
26	RX
29	GND



2.11 - RS232 SERIAL PORT (CONTACTS 27÷29, SIDE TERMINAL BLOCK)

To establish the serial connection, use a shielded cable, ensuring that the shield is grounded on one end only. If the cable has more conductors than needed, connect the unused conductors to the shield.

The serial connection cable must have a maximum length of 15 meters (EIA RS-232-C standards), beyond which it is necessary to adopt the RS485 interface provided with the device.

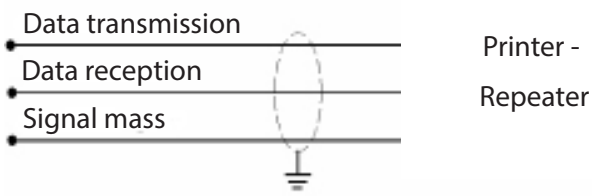
The cable must not be routed together with other cables (e.g., outputs connected to relays or power supply cables) but should ideally follow its own dedicated path.

The PC used for the connection must comply with the EN 60950 standard.

Below is the connection diagram for the PC 9-pin connector:

The serial connection cable length must not exceed 15 meters (EIA RS-232-C standards).

NUM.	Upper Terminal Block (5.08 mm pitch)
29	GND
27	TX
28	RX



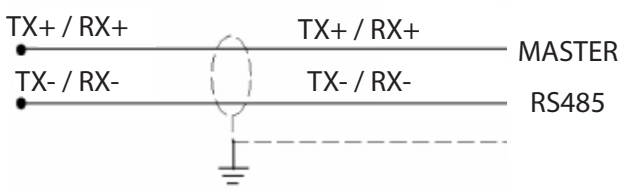
2.12 - COM3 - RS485 SERIAL PORT (CONTACTS 30÷31, SIDE TERMINAL BLOCK)

Through the RS485 serial interface, it is possible to establish serial connections over long distances. This type of connection also allows for multiple units to be connected to a MASTER using a single serial line. The maximum number of connected units is 32.

The serial connection cable must be suitable for RS485 serial communications, consisting of 1 twisted pair with shielding.

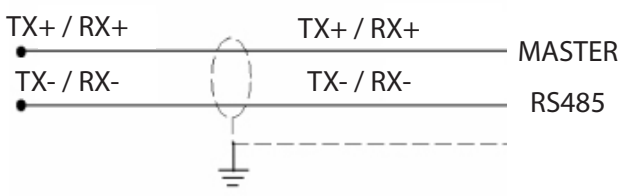
The cable must not be routed together with other cables (e.g., outputs connected to relays or power supply cables) but should ideally follow its own dedicated path.

NUM.	Upper Terminal Block (5.08 mm pitch)
30	COM 3 RS485 +
31	COM 3 RS485 -



2.13 - COM 4- RS422/485 SERIAL PORT (CONTACTS 32÷33, SIDE TERMINAL BLOCK)

NUM.	Upper Terminal Block (5.08 mm pitch)
32	COM 4 RS485 +
33	COM 4 RS485 -



2.15 - ANALOGUE OUTPUTS (CONTACTS 1÷4 UPPER TERMINAL BLOCK) (2ND OUTPUT OPTIONAL)

The instrument, when in this hardware configuration, provides two opto-isolated analog outputs in current and voltage.

NOTE: The standard configuration is made in the laboratory.

Characteristics:

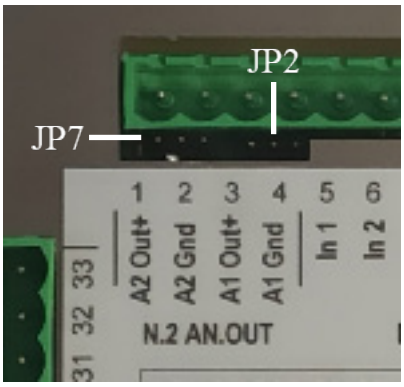
• For analog voltage output jumpers JP2 (Ana1) and JP7 (Ana2) to the RIGHT: range from 0 to 10 Volts or from 0 to 5 Volts.

• For analog current output jumpers JP2 (Ana1) and JP7 (Ana2) to the LEFT: range from 0 to 20 mA or from 4 to 20 mA.

• To make the connection, use a shielded cable, taking care to connect the shield to terminal 24 (-Instrument Power).

• Analogue transmission can be sensitive to electromagnetic interference, it is therefore recommended that cables be as short as possible and that they follow their own path.

NUM.	Morsettiera superiore passo 5.08 mm
1	Ana.2 OUT+
2	Ana.2 GND
3	Ana.1 OUT+
4	Ana.1 GND

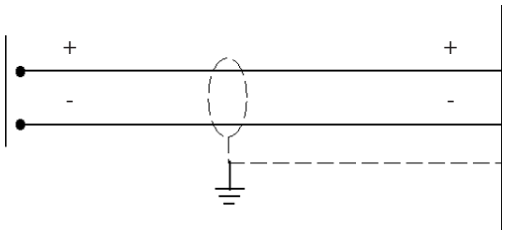


2.16 - OPTIONAL ANALOGUE INPUT (CONTACTS 34-35 LOWER TERMINAL BLOCK)

Optionally, it is possible to have an analog input with a measuring range of 0-5V, 0-10V, 0-20mA, 4-20 mA. The measuring range must be chosen when ordering and cannot be selected on the instrument.

The ADC resolution is 24 bit.

NUM.	Upper terminal block (5.08 mm pitch)
34	+V / +mA
35	GND



2.17 - USB HOST FOR PEN DRIVE

This interface allows you to directly connect a USB pen drive for reading and writing files or updating firmware and downloading/uploading setup configurations.

Characteristics:

USB connections: Mass storage device

Communication mode: USB specification 1.1 and 2.0

Maximum capacity of the pen drive: 64 GB

To facilitate the insertion of the USB stick, the connector (USB type "A" female) can be sent to the front panel using an accessory on request (see photo on the side).

2.18 - ETHERNET

Characteristics:

Transmission speed	100 Mbps
Network	Compatible con reti 10/100/1000 Base-T
Ethernet Protocols	TCP, Modbus/TCP, UDP, IP, ICMP, ARP
Communication methods	TCP server
LED indicators (2)	Ethernet line presence and communication / diagnostics
Buffer Size	256 byte
Connection Timeout	Min 30 seconds - Max 90 seconds
Link Timeout (cable disconnected)	30 seconds

- The RJ45 ethernet connection cable has a variable maximum length, depending on the type of cable. A common shielded Cat5 cable can have a maximum length of approximately 180 m.

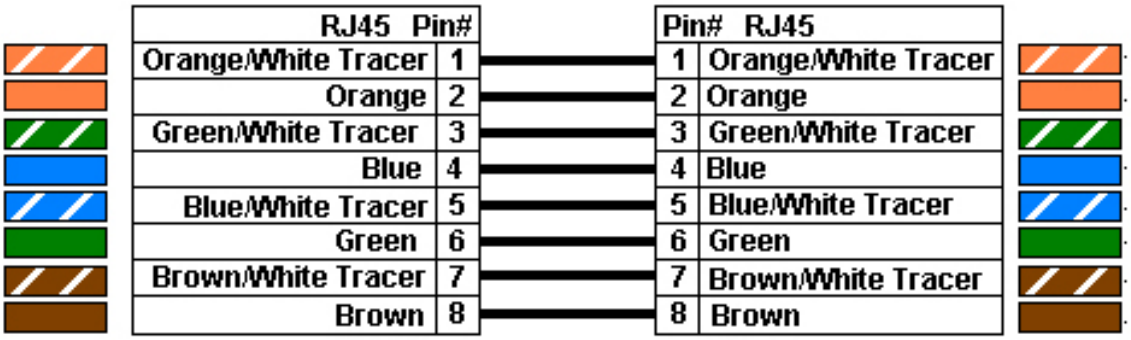
- It is possible to connect the Ethernet communication port directly to the PC, without going through other network devices (router, switch, hub, lan-bridge or other), but special RJ45 cables, called "crossover", must be used.

- Normally the cables are of the "direct" type, and allow connection to network devices such as routers or hubs, but not to directly connect two PCs (although currently there are network cards with auto-sensing technology, which recognize the type of cable and the type of connection, allowing direct PC-PC connections even using non-cross-over cables).

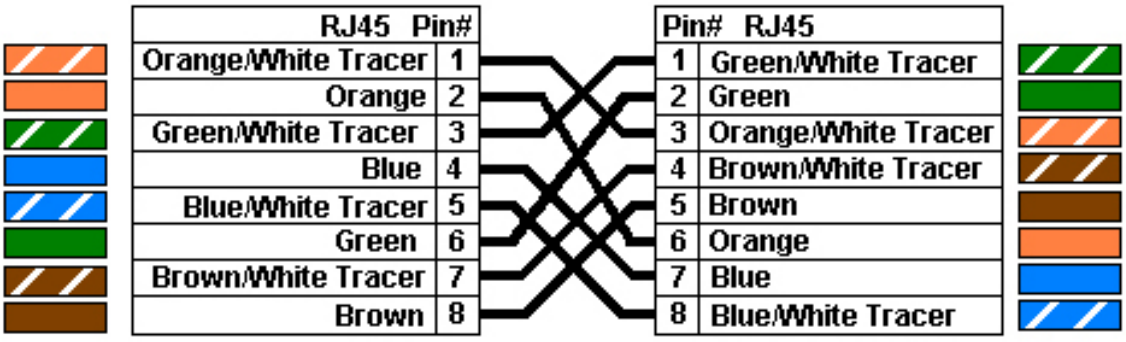
- Below are the diagrams of the two types of cables mentioned and the relative connection diagram.

- The cable must not be routed with other cables (e.g. outputs connected to contactors or power cables), but must possibly follow its own path.

Diagram with "Direct" cable



"Crossed" cable diagram

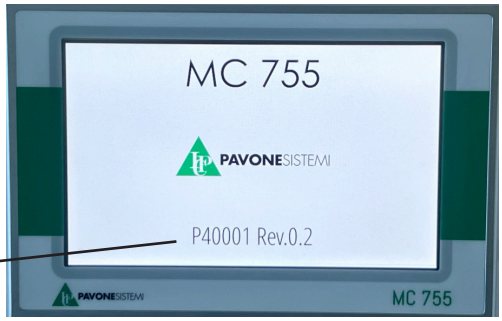


ATTENTION: For the configuration of the Ethernet interface, refer to the specific manual.

3 - STRUCTURE AND PARAMETER NAVIGATION MC755

3.1 - ELECTRONIC START-UP

When powered on, the display temporarily shows an introductory screen indicating the firmware code and version.



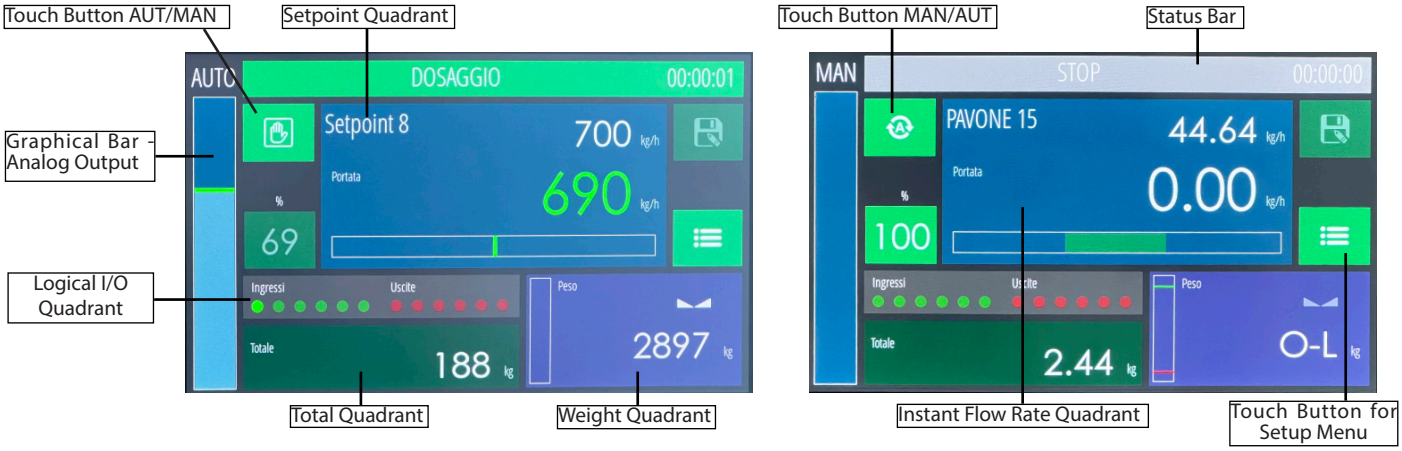
Firmware Code:

It is important to communicate the firmware code when requesting information or guidance about the instrument.

3.2 - GENERAL DATA DISPLAY

The general display screen is divided into sections, each dedicated to a measurement or parameter.

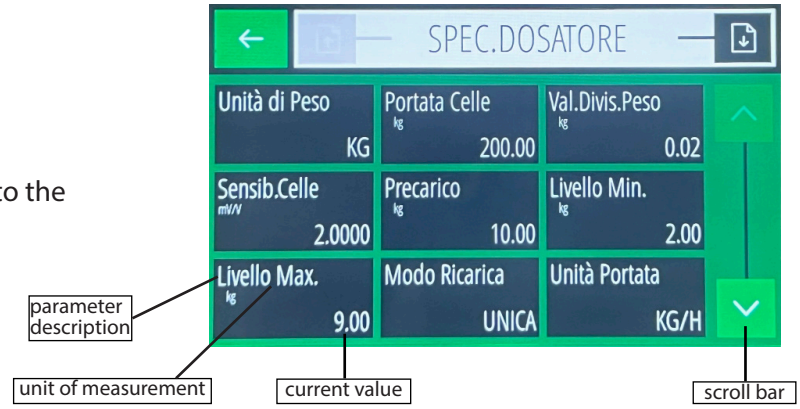
This is the standard visualization during operation or when the system is idle. Depending on the situation, pressing a section will open a dedicated screen with more details.



3.3 - ACCESS METHOD TO THE SETUP MENU

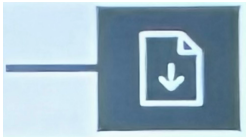
By pressing the "Setup Menu Touch Button", you access the programming of the weighing system parameters.
There are 4 options available: Info - Test - User - Technician.

This button provides access to the programming menu.



A parameter menu can consist of 1 to 9 items per screen.
If there are more than 9 commands, the scroll bar located to the

This button allows you to select the previous menu.

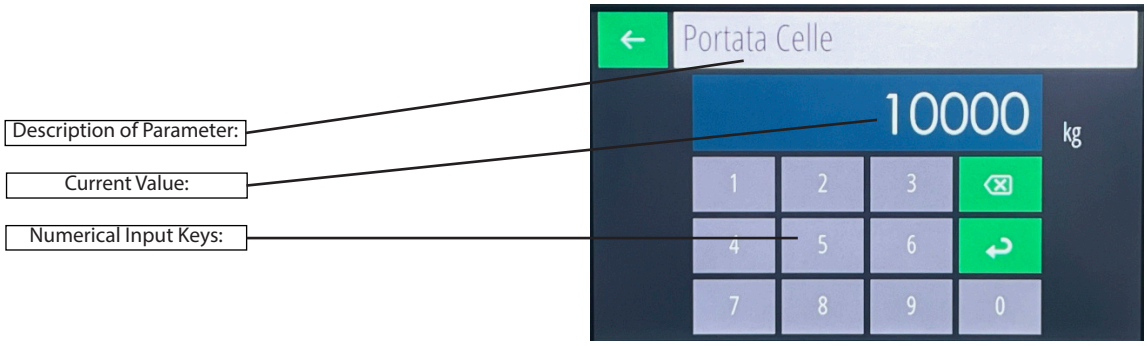


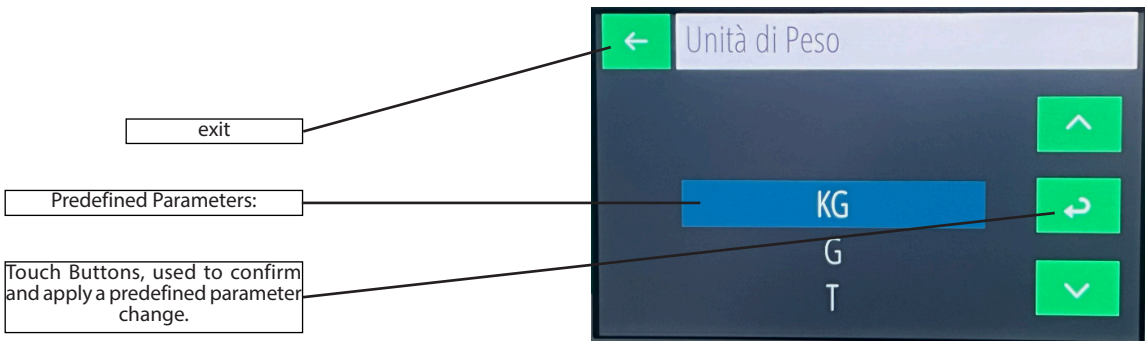
This button allows you to select the next menu.

3.4 -PARAMETER PROGRAMMING METHOD

The parameter programming procedures are divided into two types:

- Programming of numerical parameters.
- Selection of parameters with predefined values.





3.5 - TOTAL QUADRANT

In the general screen, pressing the "Total" quadrant opens a detailed screen where additional information is displayed.

Set	Setpoint, the total transported weight. When the total reaches this value, the corresponding output is activated.
Preset	When the remaining value to reach the setpoint is less than this, the corresponding output is activated.
Coda	Anticipates output activation compared to the setpoint value.

Pressing the Total General or Partial Total quadrants allows you to reset the total values stored.

3.6 - QUADRANTE: SET POINT

In the general screen, pressing the Set Point quadrant opens the detailed screen of the flow rate setpoint. Here, you can also program the setpoint values.

Touch Button for Setpoint Programming:

Selected Setpoint Number

Selected Setpoint Name

The bar graph and the percentage value in the center indicate the proportion of the active setpoint value compared to the full scale.

Percentage Compared to Maximum Flow Rate

3.7 - FLOW RATE QUADRANT

In the general screen, pressing the Flow Rate quadrant opens the detailed screen for instantaneous flow rate, where additional information is displayed.

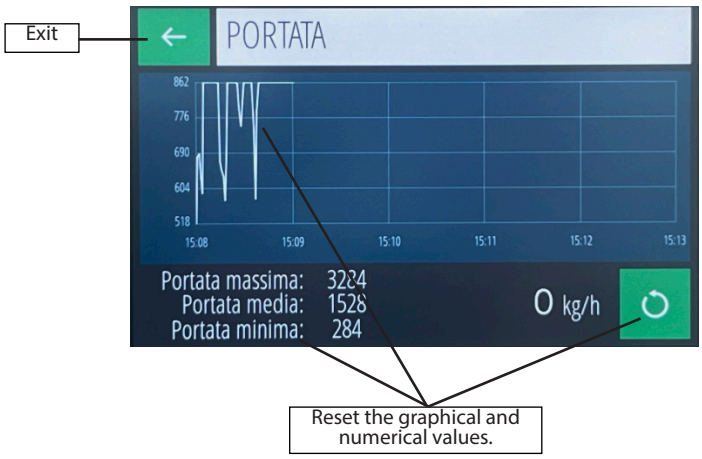
TECHNICAL NOTE: GRAPHICAL REPRESENTATION OF THE FLOW RATE

The graph represents 300 values, one value per second over 5 minutes, regardless of the sampling time.

When the graph is fully completed, the last third (50 values) is redrawn at the beginning, and the representation continues.

The Max, Min, and average values refer to the data represented in the graph.

The central reference line corresponds to the current flow rate setpoint. The lines above and below the central one represent the set tolerance, either programmed or set at 25% of the setpoint.



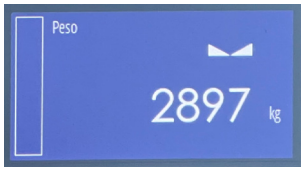
The current flow rate values, as well as the minimum, maximum, and arithmetic average of the previous instantaneous flow rate values represented in the graph, are displayed.

3.8 - STATUS AND TIMER QUADRANT

This quadrant displays a message indicating the operating status of the instrument and a timer (hours:minutes:seconds) related to the operating time, which resets at the start of operation. The status message on the general screen indicates the STOP (halt) or OPERATING condition. During other procedures, it may display the following states:

State	Description	Background
Stop	Dosage system stopped.	Grey
MANUAL Dosage	Dosatore con regolazione automatica	Orange
AUTO Dosage	Fase di ricarica AUTOMATICA o MANUALE	Green
AUTO/MAN Refill	Automatic or manual refill phase.	Blue
Various errors	Out of tolerance, Weight error	Red
Various errors	Volumetric block	Yellow

3.9 - DIAL 6: CURRENT WEIGHT

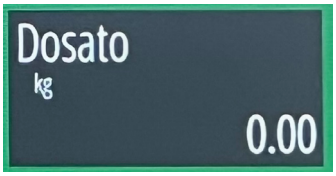


This dial displays the current detected weight.

In case of load cells not connected or faulty connection cable, the message NO CONN is displayed instead of the measurement.

If the weight is not calibrated, the flashing message NO CAL is displayed instead of the weight; the various serial protocols and the drive are also inhibited.

3.10 - DIAL 7: WEIGHT ASSESSED IN THE LAST SAMPLING PERIOD



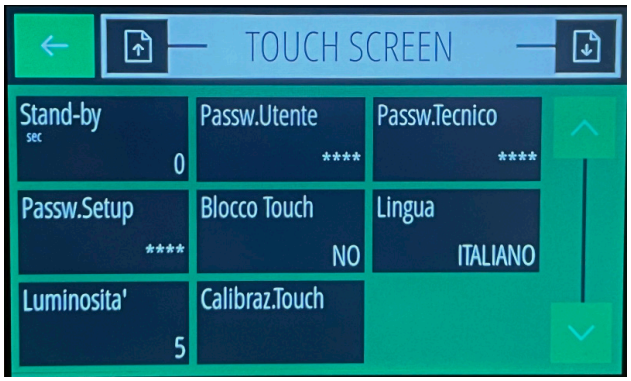
This dial, located within the total menu, displays the net weight dosed in the last sampling period, programmable in seconds from 3 to 120, expressed in the same unit as the current net weight.

3.11 - MC755 MENU PROGRAMMING LEVELS

The programmable parameters are organized in 3 different levels: User, Technician and Setup.

A programmable password can be enabled for each level to access the menu.

Modifying the parameters could compromise the operation of the machine, therefore it is recommended to do so only if you are an expert and in any case after having read the manual.



3.12 - MENU - (MENU)

This button allows access to the programming menu

3.13 - USER MENU - (MENU)

Contains the functions and parameters that can normally be changed by the operator based on work needs

- Regulation parameters
- I/O selections
- Operating times
- Variable filters

3.14 - TECHNICAL MENU - (MENU -> TECHNICAL MENU)

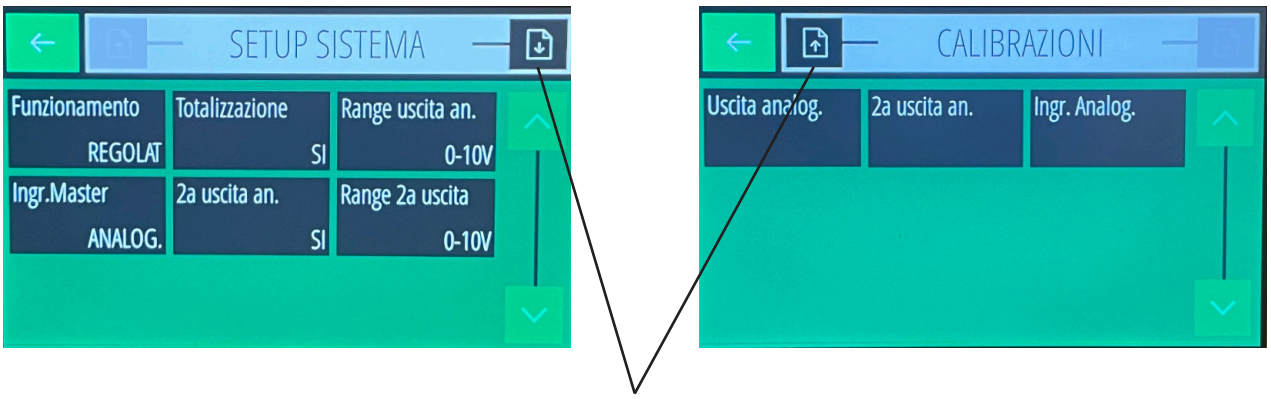
Contains settings related to the type of machine and the operating mode, normally to be used during the start-up phase (recommended for expert personnel):

- Doser specifications
- System calibration
- Communication ports
- Touch screen
- Archives
- Date hours

4 - SYSTEM MENU - (ACCESS ONLY IF EXPERT)

Contains the instrument configuration functions/parameters, the modification of these parameters is normally carried out during the indicator production phase

This button allows access to the System Setup menu.
A long press of at least 3 seconds is required.



This button allows you to choose the menu with the modifiable parameters

4.1 - TOUCH SCREEN PROGRAMMING MENU - PROGRAMMING LEVEL PROTECTION

Each level can be associated with a protection password, programmable from the technical menu, which will be requested before accessing the relative menu.

By programming 0 as the password, access to the menu is free, therefore the password request is deactivated.

From the TECHNICAL MENU select TOUCH SCREEN, and from here it is possible to determine the protection level of the Touch Screen and the possible programming of the 3 passwords (4-digit password).

The blocking level can be selected between the following 3 ways:

USER	Free access to the main screen dials and the user menu without a password.
TECHNICAL	Free access to the main screen dials, but a password is required (if programmed) to access the user menu.
SYSTEM SETUP	Access denied to the main screen dials and a password is required (if programmed) to access the user menu. Free access to the main screen dials and the user menu without a password.

4.2 - PARAMETER NAVIGATION TABLES

SETUP MENU

Access from the main screen by holding down the MENU button for 3 seconds.
Programmable password (default = 2286)

Submenu	Parameter / Function	Unit	Description
System Setup	Operation		Select TOTALIZER / REGULATOR
	Totalization		Select NO/YES
	Calibrations		Selection 0-10V, 0-5V, 0-20mA, 4-20mA
	Master Input		Selection (NONE / SERIAL / ANALOG)
	2nd Analog Output		Selection NO/YES: Only if regulator the second output transmits the instantaneous hourly flow rate
	2nd Output Range		Selection 0-10V, 0-5V, 0-20mA, 4-20mA
Calibrations	Analog Output		Calibration procedure
	2nd Analog Output		Calibration procedure
	Analog Input		Calibration procedure

INFO SECTION

Submenu	Parameter / Function	Notes
Firmware	SW Code	Read Only
	Version	
Parameters	Weight Full Scale	
	Flow Range	
Connections	Fieldbus	
	Address	
Analog	Output 2 (activation)	
	Input (activation)	

TEST SECTION

	Parameter / Function	Description
Test HW	Simulation	Dosing simulation procedure.
	Cell Signal	Signal display (mV)
	Cell Percentage	Percentage display with respect to full scale
	Memory Test	Internal memory reading and writing test
	I/O Test	Logic input and output test procedure
	Com Port Test	View received strings and transmission test of the received string, for COM1, COM2, COM3 and COM4
	Touch Test	Touch screen test
	Analog Output 1	Analog output test
	Analog Output 2	Analog output test
	Analog Input	Signal display (V or mA)

4.3 - USER SECTION

Programmable password (default = 166)

Submenu	Parameter / Function	Unit	Notes
Par.Regulation	Sample Time	sec	From 3 to 120 sec for flow rate calculation (10Hz calculation if t<=20, 5 if 20<t<=40, 2.5 if 40<t<=80, 1.25 if t >80)
	Proportional Const.	%	Amount of regulation intervention proportionally to the flow rate/setpoint deviation (from 0.01 to 2.50)
	I/O Selections	%	It is the maximum variation of the instantaneous flow rate, compared to the setpoint, beyond which an external disturbance is intercepted, with consequent intervention of the volumetric block
	Dead Band	kg/h	Minimum difference of the instantaneous flow rate compared to the setpoint, within which the regulation does not intervene. It is also used to consider the regulation stability condition.
	Operating Times	kg/h	Flow rate tolerance (in + or -)
	Flow Rate Delta	%	At the start of dosing or setpoint modification, if the difference between the last calculated flow rate and the setpoint is greater than this value, the regulation output is theoretically recalculated.
	Variable Filters	%	Minimum value of the regulation output
	Max. Reg Output	%	Maximum value of the regulation output
I/O Selections	Total Pulse Value	kg	Totalized weight corresponding to the output pulse
	Recharge Alarm		Selection of the recharge timeout activation (YES/NO)
	Alarm Output Logic		Selection of the logic activation of the alarm output 4 (N.O./N.C.)
	Tolerance Output Logic		Selection of the logic activation of the out-of-tolerance output 5 (N.O./N.C.)
	Input Function 5		Selection of the function of input 5 (Selection of setpoint / Recharge)
	Input Function 6		Selection of the function of input 6 (Selection of setpoint / Total reset)
Operating Times	Start Delay	sec	Delay in measuring the flow rate and modifying the regulation at the beginning of dosing and at the end of recharge (from 0 to 200)
	Stop Delay	sec	Delay in measuring the flow rate and modifying the regulation at the end of dosing (from 0 to 200)
	Recharge Timeout	sec	Maximum duration of recharge (from 0 to 999)
	Tolerance Delay	sec	Delay in activating the tolerance alarm (from 0 to 200)
	Start Tolerance Delay	sec	Delay in activating the tolerance alarm after starting dosing or ending recharge (from 0 to 200)
Variable Filters	Flow Rate Filter		Filter factor of the hourly flow rate (0 – 9)
	Weight Filter		Weight filter factor (0 – 9)
	Minimum Flow Rate	kg/h	Minimum flow rate below which a weight extraction alarm is generated
	Neg. Flow Rate	%	Percentage of the max flow rate, if the negative flow rate is higher than this value, the car recharge is inserted (if selected) and the volumetric block condition is activated.

4.4 - TECHNICAL SECTION

Programmable password (default = 1599)

Submenu	Parameter / Function	Unit	Description
Doser Specs	Weight Unit		Selection kg, g, t.
	Cell Capacity	<weight unit>	From 1 to 100000
	System Calibration	<weight unit>	Selection from 0.001 to 50
	Cell Sensitivity	mV/V	Used for automatic theoretical calibration
	Preload	<weight unit>	Used for automatic theoretical calibration and automatically set after zero calibration (Sample Weights Calibration)
	Min. Level	<weight unit>	
	Max. Level	<weight unit>	Selection SINGLE (single phase until the input is reopened), MAX LIV (in multiple phases until the max level is reached), AUTO (up to max level without input management)
	Recharge Mode		Selection kg/h, t/h.
	Capacity Unit	<flow rate u.>	Maximum system flow rate corresponding to the maximum adjustment value of the analog output
	Max. Capacity	<flow rate u.>	Selection from 0.001 to 50
	Capacity Div. Value	<weight unit>	Selection from 0.001 to 50
	Total Div. Value	<unità peso>	Selection <flow rate unit> / %
	M-Band Unit		Selection <flow rate unit> / %
	Toler. Unit		Sample weight calibration procedure.
System calibration	Sample Weight Cal.		Automatic theoretical calibration procedure based on the doser data.
	Automatic Cal.		System calibration procedure with total dosed weight, determines the value of the correction factor.
	Dosed Weight Cal.		Correction factor of the hourly flow rate and total dosed weight. The weight calibration is not affected.
	Correction Factor		Doser calibration procedure.
	Doser Calibr.		Doser calibration procedure.

Comm. Doors	Com1 – Rs232		Access to the relevant parameter setting submenu
	Com2 - Rs232		Access to the relevant parameter setting submenu
	Com3 - Rs485		Access to the relevant parameter setting submenu
	Com4 – Rs485		Access to the relevant parameter setting submenu
	Ethernet		Access to the relevant parameter setting submenu
	Fieldbus		Access to the relevant parameter setting submenu (not yet implemented)
Touch screen	Stand-by		In seconds (max 999) (0 = function deactivated)
	User Password		Password for changing parameters / executing functions of the User menu.
	Technical Password		Password for changing parameters / executing functions of the Technician menu.
	Setup Password		Password for accessing the setup menu
	Touch Lock		Selection (YES/NO) for requesting the technician password for dial and key functions.
	Language		Selection ITA, ENG.
	Brightness		Numerical setting (0 min – 9 max)
	Touch Calibration		Touch screen calibration procedure
Archives	Datalogger		Selection OFF, Single, Continuous.
	Log Frequency		For continuous log: selection 10Min, 5Min, 1Min, 10Sec, 5Sec, 2Sec, 1Hz.
	File Management		File exchange procedure with USB pen drive and internal memory.
	USB Memory		Memory Sharing on USB Device.
	Save Setup File		Stores instrument configuration files on USB stick.
Time and Date	Current Date		
	Current Time		

5 - TECHNICAL NOTE: REGULATION PARAMETERS

- Sampling time: The time considered for calculating the instantaneous flow rate. The instantaneous flow rate is calculated by interpolating the latest weight data sampled during this time using the least squares method to determine the trend line representing the instantaneous flow rate. With a higher sampling time, the flow rate appears more filtered. The update frequency of the instantaneous flow rate varies based on the set sampling time (10 Hz for sampling time ≤ 20 seconds, 5 Hz for sampling time > 20 seconds and ≤ 40 seconds, 2.5 Hz for sampling time > 40 seconds and ≤ 80 seconds, 1.25 Hz for sampling time > 80 seconds and ≤ 120 seconds).

- Proportional constant: This parameter determines the extent of regulatory intervention in proportion to the deviation of the instantaneous flow rate from the setpoint. A value of 1.00 sets a correction proportional to the deviation, 0.50 halves it, and 2.00 doubles it.

- Flow rate sensitivity: This is the maximum variation in the instantaneous flow rate relative to the setpoint, beyond which an external disturbance is detected, triggering volumetric block intervention. (Refer to the related technical note).

- Deadband: The minimum difference between the instantaneous flow rate and the setpoint within which regulation does not intervene. It is also used to consider the stability condition of the regulation.

- Tolerance: Tolerance value for the flow rate setpoint.

Flow rate delta: Difference between the setpoint flow rate and the calculated flow rate, expressed as a percentage of the setpoint flow rate. If the difference between the setpoint flow rate and the latest calculated flow rate exceeds the value set in this parameter, the regulation speed is recalculated (with "delta flow rate = 0," the initial regulation speed is always recalculated). This control is performed when dosing restarts, after a pause, or following the selection of a new set.

Minimum regulation output: The minimum regulation output value (zero flow rate) for managing the activation of vibrating channels. This is set as a percentage relative to the calibration range of the analog output (e.g., 20.0% of 0-10 V corresponds to 2 V).

Maximum regulation output: The maximum regulation output value (maximum flow rate) for managing the activation of vibrating channels. This is set as a percentage relative to the calibration range of the analog output (e.g., 80.0% of 0-10 V corresponds to 8 V).

5.1 - TECHNICAL NOTE: OPERATING TIMES

Start delay: The time at the beginning of dosing, before considering the instantaneous flow rate, to allow the doser to reach the commanded operating speed.

Stop delay: The time at the end of dosing (input 1 open) during which the device, even without regulating the flow rate, continues to totalize the product. Dosing cannot be resumed before this time expires.

Recharge timeout: The maximum time within which recharging must occur during dosing before generating the related alarm.

Tolerance delay: The delay in activating the tolerance alarm for the flow rate. The alarm is activated only after the flow rate remains out of tolerance for at least this time.

Start tolerance delay: The delay, relative to the start of operation, during which the device does not perform flow rate tolerance control of the instantaneous flow rate.

5.2 - TECHNICAL NOTE: VARIABLE FILTERS

-Flow filter: This parameter allows you to manually set the number of elements used for the arithmetic mean applied to the Hourly Flow value.

-Weight Filter: This parameter allows you to manually set the number of elements used for the arithmetic mean applied to the weight value.

-Minimum flow rate: Below this threshold the flow rate is considered zero and the flow rate alarm is generated.

-Negative flow rate: Percentage of the max flow rate, if the negative flow rate is higher than this value, the car recharge is activated (if selected) and the volumetric block condition is activated.

5.3 - TECHNICAL NOTE: FIRST SAMPLING PERIOD

The first sampling period is considered to be the flow rate calculation following the start of dosing, modification of the current setpoint (programming or selection) of a value higher than the flow rate sensitivity, at the end of recharging, at the end of the intervention of the volumetric regulation block. During this time, the partial instantaneous flow rate data are averaged with the presumed value (setpoint) in a manner proportional to the elapsed time.

FLOW RATE ADJUSTMENT: TECHNICAL NOTES

5.4 - TECHNICAL NOTE: ADJUSTMENT LOCK

The Flow Sensitivity parameter, expressed as a percentage, controls the regulation lock function. In automatic operating conditions, when the detected instantaneous flow rate differs from the setpoint by a value greater than this percentage, even though the analogue regulation output should produce the desired flow rate, the regulation does not intervene and remains locked. This lock function is activated only after a regulation stability (dead band) has been reached from the start of dosing, or from the start of automatic operation or from the variation of the flow setpoint by a percentage equal to this parameter. If during the regulation lock, the flow rate remains constant, due to the effect of the output, the function is immediately deactivated. The flow rate is considered constant when it varies no more than 1%. During the regulation lock, the display of the instantaneous flow rate is also locked.

5.5 - TECHNICAL NOTE: MANAGEMENT OF REGULATION IN CASE OF SETPOINT MODIFICATION

During dosing, in case of modification (programming or selection) of the current setpoint, if the difference between the setpoint flow rate and the last calculated flow rate is greater than the percentage relating to the Delta flow rate parameter:

- The control output immediately assumes the value calculated proportionally to the full scale and corrected based on the values stored in the dosing device calibration procedure.

- The control procedure does not consider previous data, but only the flow rate detected after the setpoint change before intervening.

- The detected flow rate filter is reset, assuming the new setpoint as the instantaneous flow rate.

If the setpoint change occurs in stop conditions, the calculated values are assumed at the start of the next dosing.

5.6 - TECHNICAL NOTE: METHOD OF REFILLING THE DOSER

Recharge operation selection is performed with parameter 40161.

SINGLE: recharge is performed with a single operation even if the max level is not reached, as long as the recharge input remains closed;

MAX LEVEL: recharge can be performed in multiple phases and ends only when the max weight level is reached;

AUTO: recharge is automatically recognized by the instrument if during dosing the flow rate detected is negative and higher in absolute value than the set threshold (Negative Flow rate parameter).

5.7 - TECHNICAL NOTE: USB MEMORY

Connect the PC with a standard cable to the USB device port of the instrument.

Warning: the first time you connect, the instrument memory must be formatted, using the default parameters proposed.

The internal memory of the instrument is seen as remote memory in Windows Explorer on the PC, allowing file import and export operations.

5.8 - TECHNICAL NOTE: CONFIGURATION FILES

The "Save Setup File" function, in the ARCHIVES menu, allows you to make a copy of the instrument's configuration parameters to a file.

The configuration file is stored on a USB pendrive in the "Setup" folder, which is automatically created when the function is started.

The configuration file is stored with the extension ".mem", in the format "P40001102.mem" (01 = program number, 02 =version number).

 The configuration parameters, stored in a file, can be transferred to other instruments. To perform this operation, you must start the "File Management" function in the ARCHIVES menu on the instrument into which you wish to import the configuration, press on the file with the ".mem" extension and then press the function key at the top right.

5.9 - TECHNICAL NOTE: FIRMWARE UPDATE

To perform firmware programming, a USB pendrive is required.

The firmware file to be programmed must be renamed to "P400.hex" and copied into the "Update" directory, specifically created in the USB pendrive.

Insert the pendrive into the USB port of the instrument and turn on the device by pressing the touch in the top left corner.

During the update, the programming progress bar is displayed.

At the end of programming, the instrument restarts automatically.

5.10 - TECHNICAL NOTE: DATA LOGGER

The datalogger function allows you to record the records with the main system data on the USB stick connected to the USB Host port, in a ..\Log\logxxxx.csv file

The function can be selected:

- "SINGLE" with manual storage of a record with the appropriate button on the main screen.
- "CONTINUOUS" with continuous automatic storage of records at the selected frequency.

The log record is composed as follows:

<date>; <time>; <status>; <instantaneous flow rate>; <max flow rate>; <dosed weight>; <weight>; <Man/Auto>; <output value>; <setpoint>; <alarm>

Where:

<stato>	Description
0	STOP
1	START
2	DOSAGE
3	RECHARGE
4	END OF RECHARGE

<alarm>	Description
0	None
2	WEIGHT ERROR
3	FIELDBUS ERROR
4	F-BUS CRC ERR
5	NO FIELDBUS COM
6	ADJUSTMENT FAILED
7	RECHARGE TIMEOUT

5.11 - TECHNICAL NOTE: FILE MANAGEMENT

This function allows you to explore the files on the inserted USB stick and the files in the internal memory, navigating through the folders.

TOUCH

Once you have selected a file you can:

- Copy a file from one memory to another
- Delete the selected file.

5.12 - TECHNICAL NOTE: ON FLOW RATE ADJUSTMENT

TECHNICAL NOTE: REGULATION MANAGEMENT IN CASE OF SET POINT MODIFICATION

During dosing, in case of modification (programming or selection) of the current setpoint, if the difference compared to the previous value is greater than the percentage relating to the "Flow sensitivity" parameter:

- the regulation output immediately assumes the value calculated proportionally to the full scale and corrected based on the values stored in the doser calibration procedure;
- the regulation procedure does not consider previous data, but only the flow rate detected after changing the setpoint before intervening;
- the detected flow filter is reset, assuming the new setpoint as the instantaneous flow rate.

If the setpoint change occurs in stop conditions, the calculated values are assumed at the start of the next dosing.

5.13 - TECHNICAL NOTE: MANUAL OUTPUT ASSOCIATED WITH THE SET POINT

Each setpoint is associated with a manual control output percentage.

- When a setpoint value is programmed or modified, an associated manual output value is proposed, calculated proportionally to the full scale value and corrected based on the values stored in the doser calibration procedure; it is then possible to modify the proposed value.
- When the operation switches from AUTO to MAN during dosing, the current output value is stored in the manual output parameter associated with the setpoint.
- When during dosing the current setpoint value is changed by at least a percentage corresponding to parameter 41008, the associated manual output value is recalculated proportionally with respect to the full scale value and corrected based on the values stored in the doser calibration procedure.
- When a new setpoint is selected or the selected setpoint is changed, the manual output value assumes the value associated with the setpoint itself.

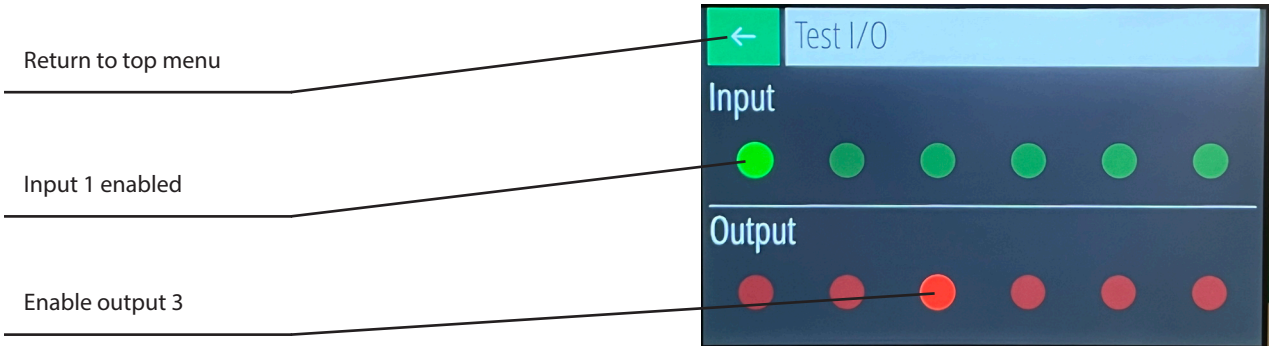
5.14 - TECHNICAL NOTE: GENERAL TOTAL

The grand total counts the total dosed weight separately from the partial total (lower level). Resetting the partial total value does not reset the grand total, while resetting the grand total resets the partial total.

The control of the total setpoint outputs cannot be linked to the grand total.

5.15 - IN-OUT TEST PROCEDURES

This procedure allows you to view the status of the logical inputs and outputs, and force the status of the outputs by acting on the touch screen



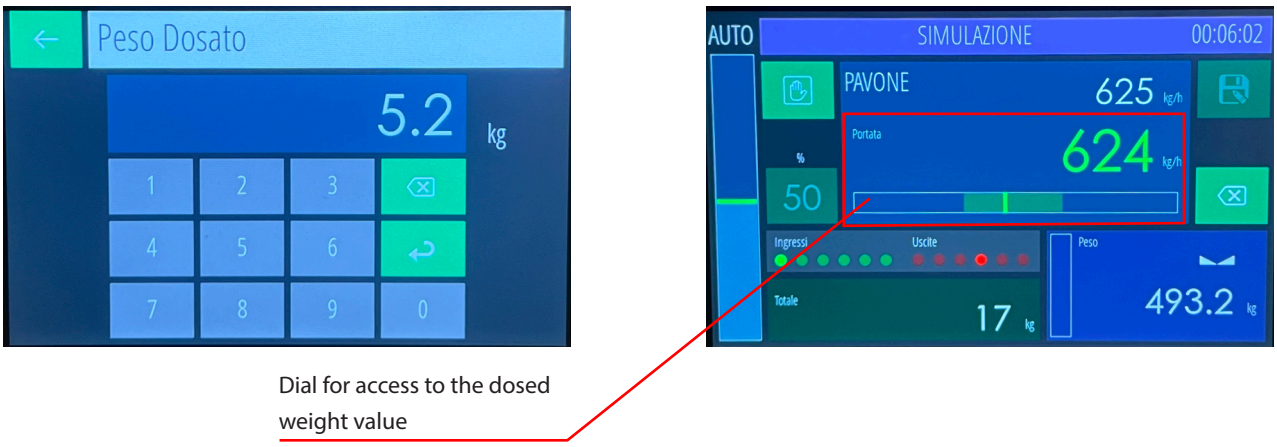
5.16 - SIMULATION PROCEDURE

In the simulation procedure, the current weight is acquired by the load cells.

The dosed weight value in the sampling time, which can be set manually, determines the instantaneous hourly flow rate of the system.

The access to the dosed weight value is done by pressing the flow quadranet.

The rest of the operation is the operational one with dosing control, logical and analog I/O.



6 - WEIGHT CALIBRATION PROCEDURE

After programming the following parameters, in the doser specifications menu:

- Weight unit

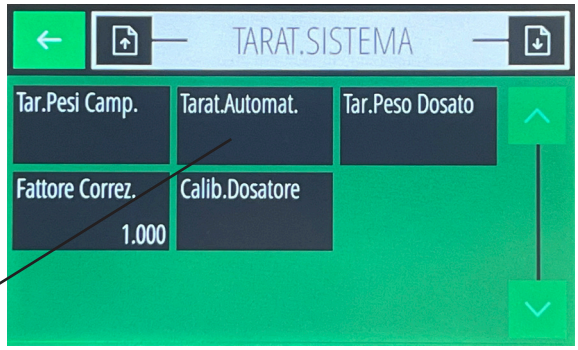
- Cell capacity

- Weight division value

- Cell sensitivity

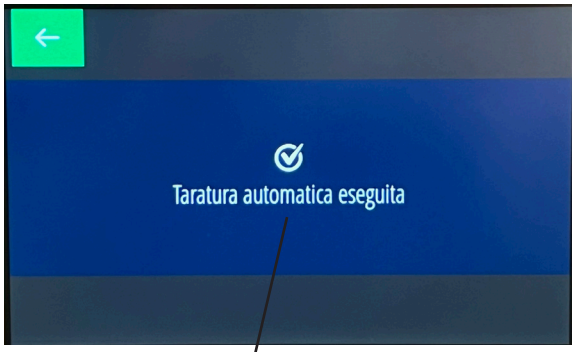
You can proceed to perform an automatic calibration of the weighing system.

Select the "TECHNICAL" setup menu and then the "SYSTEM CALIBRATION" menu



Dial for performing automatic calibration

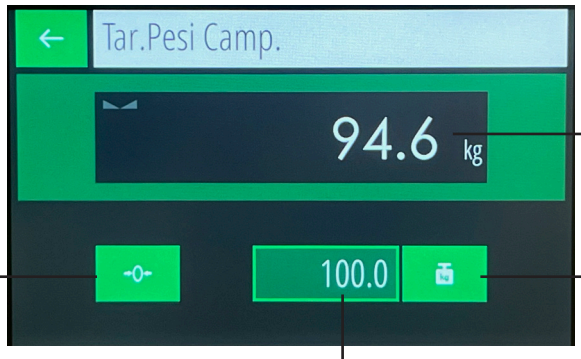
Confirm execution calibration



Confirm calibration performed

6.1 - CALIBRATION PROCEDURE WITH KNOWN WEIGHTS

This procedure corrects the automatic calibration performed previously.



Displayed weight to be corrected

Vacuum system reset button

Confirmation button for applied sample weight

Sample weight value

6.3 - DOSER CALIBRATION PROCEDURE

This procedure calibrates the regulation output.

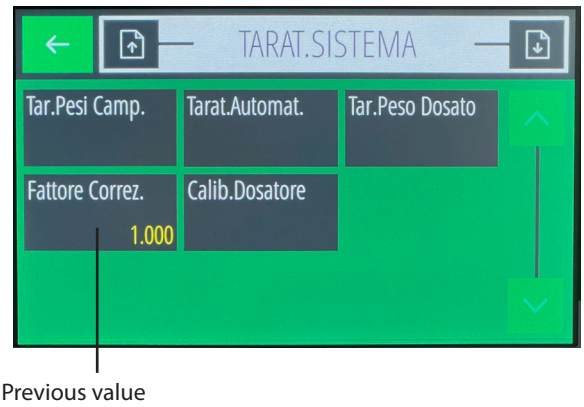
The procedure involves carrying out a test at a constant manual speed by weighing the unloaded material on a sample scale.

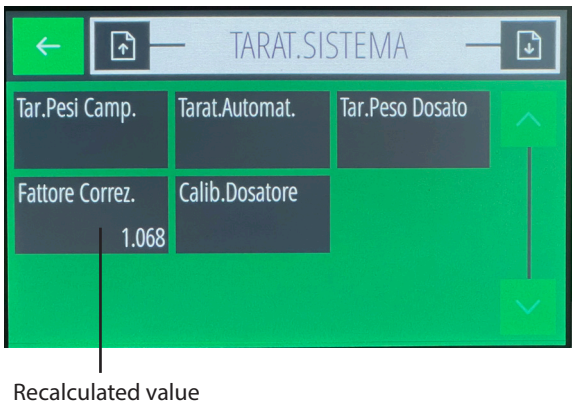
Before carrying out the test, it is necessary to reset the General Total.

Once the test is complete, select the "SYSTEM CALIBRATION" menu and press the "Tar. Dosed Weight" touch key.

The following screen will appear in which you can correct the weight value just unloaded.

By pressing the confirmation touch button, the weight indicator changes the correction factor present in the upper menu.





The value of the correction factor can also be changed manually by entering the current value increased or decreased as a percentage compared to the difference in weight between real and theoretical.

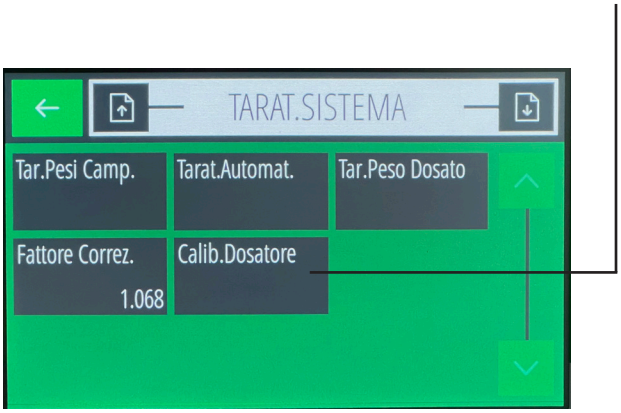
6.3 - DOSER CALIBRATION PROCEDURE

This procedure calibrates the regulation output at different speeds, so as to better refine the operation of the doser.

The procedure involves performing several tests at a constant manual speed with the weighing of the unloaded material on a sample scale.

Before carrying out the test, it is necessary to reset the General Total.

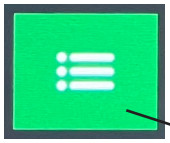
This menu is accessed by clicking the "Doser Calibration" dial in the "SYSTEM CALIBRATION" menu.



Before starting a dosing (IN 1closed) program the manual output value related to the operating speed of the doser (Hourly operating flow rate).

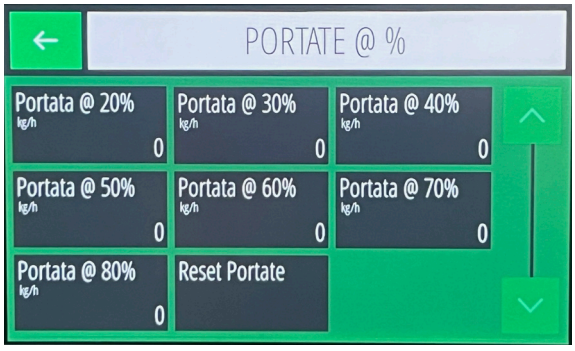
The flow rate dial will provide us with the current flow rate value that we can enter in the FLOW RATES menu.

Repeat the flow rate tests at speeds 20%, 30%, 40%, 50%, 60%, 70%, 80%.



This button allows access to the COURSES menu

Manual exit value



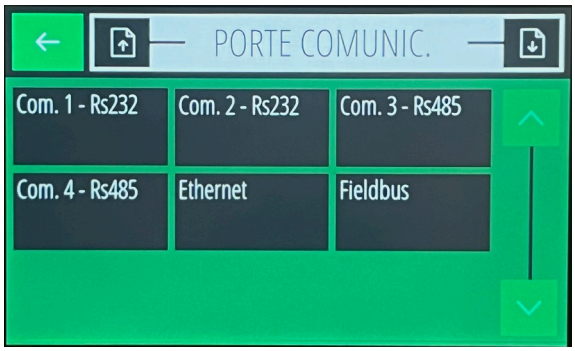
6.4 - COMMUNICATION PORTS

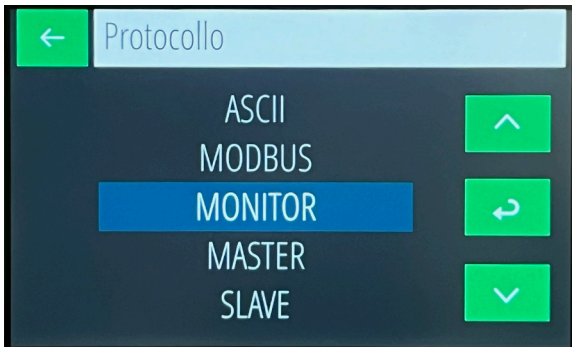
The MC755 weight indicator has
- N° 2 Rs232 serial ports
- N° 2 Rs485 serial ports
- N° 1 Ethernet (LAN)
- N° 1 USB Host for pen drive N° 1 USB Device
- N° 1 optional Fieldbus interface: Profinet, Ethernet-IP.

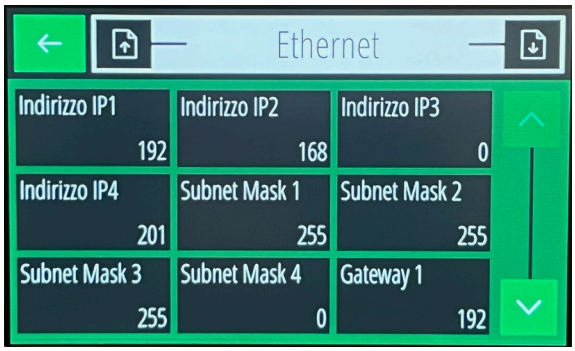
- The serial ports Com. 1 - Rs232 and Com. 2 - Rs232 can manage the following protocols:
Repeater, AscII, Modbus, Monitor, Master, Slave, I/O EXT, Print.
- The serial ports Com. 3 - Rs485 and Com. 4 - Rs485 can manage the following protocols:
Repeater, AscII, Modbus, Monitor, Master, Slave, I/O EXT.

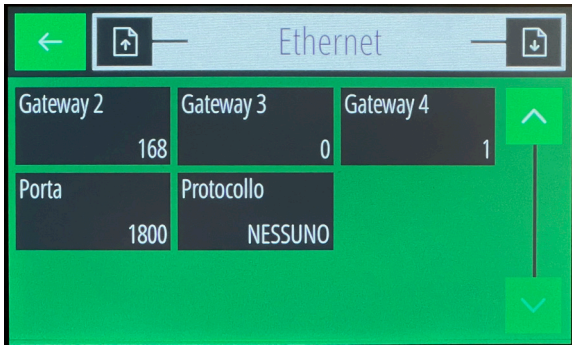
The Ethernet port can handle the following protocols:
Repeater, AscII, Modbus, Monitor, Master, Slave, I/O EXT.

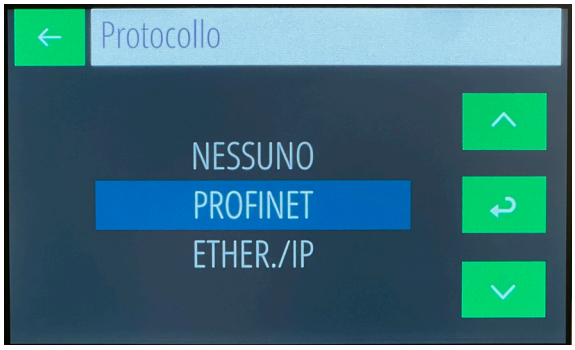
The optional Fieldbus port can handle the following protocols: Profinet, Ethernet/IP.











7 - SERIAL REPEATER PROTOCOL

The communication string is sent at a frequency of 5 Hz.

STX	M	F	PPPPPPPP	TTTTTTTT	ETX	CC	EOT

M (1 char.): Dosing status ('1' in dosing; '0' in stop)
F (1 char.): Operation ('M' manual; 'A' automatic)
PPPPPPPP (8 char.): Hourly flow rate
TTTTTTTT (8 char.): Total
CC (2 char.): Checksum

7.1 - ASCII SERIAL PROTOCOL

The communication protocol always requires the PC to send a string containing the address of the instrument receiving the command, followed by the response string of the instrument concerned.

Maximum response delay 25 mS.

The following parameters are common in the following description of the strings:

ADDR	recipient address (80h + address number; e.g. address 1: a = 81h)
ETX	end of text (03h)
EOT	end of transmission (04h)
ACK	acknoledgy (06h)
NAK	NO acknoledgy (15h)
<CC>	check sum calculated from ADDR to ETX excluded; they are 2 ASCII characters of hexadecimal notation result of the XOR operation of the characters
<CMD>	command identifier consists of an ASCII character (an uppercase letter)

LIST OF COMMANDS

A. PROGRAMMING THE FLOW RATE SET POINT
B. READING THE FLOW RATE SET POINT
C. SELECTING THE SET POINT
D. PROGRAMMING THE SET TOLERANCE
E. READING THE SET TOLERANCE
F. PROGRAMMING THE TOTAL DOSED SET POINT
G. READING THE TOTAL DOSED SET POINT
H. RESETTING THE TOTAL DOSED SET POINT
I. MANUAL / AUTOMATIC SELECTION
J. PROGRAMMING THE REGULATION PARAMETERS
K. READING THE REGULATION PARAMETERS
L. READING THE INSTRUMENT STATUS
M. MODIFYING THE FLOW RATE SET POINT PERCENTAGE
N. PROGRAMMING THE MIN AND MAX LEVELS
O. READING THE MIN AND MAX LEVELS
P. PROGRAMMING THE LINEARIZATION POINTS (20%, 30%, 40%, 50%, 60%, 70%, 80%)
Q. READING LINEARIZATION POINTS (20%, 30%, 40%, 50%, 60%, 70%, 80%)
R. READING MAX SYSTEM FLOW
S. READING INSTANTANEOUS ANALOG OUTPUT PERCENTAGE
T. RESETTING LINEARIZATION POINTSU. PROGRAMMING SELECTION ADJUSTMENT
V. READING SELECTION ADJUSTMENT

7.2 - CONTROLS

The commands are available in any condition the instrument is in except for the A,D,F,J,N,P,T,U commands during keyboard programming of the related parameters.

COMMUNICATION STRING FORMAT

All strings passed to the instrument have the following format; the instrument response strings also have the same format except the error string, the command not available string and the acknoledgy string.-

String type	ADDR <CMD> <dati> ETX <CC> EOT
Acknoledgy string	ADDR <CMD> ACK EOT
Communication error or unacceptable data string	ADDR NAK EOT
- Command string not available	ADDR "#" EOT

All values in the fields are formatted without decimal points and with leading zeros equal to '0' (30h).

A) FLOW RATE SET POINT PROGRAMMING

The PC transmits: ADDR "A" <N> <XXXX> ETX <CC> EOT
<N> = set point number. (from "1" to "9" and from "A" to "F" for set points from 10 to 15)
<XXXX> = flow set point without decimal point

The instrument responds: ADDR "A" ACK EOT

B) FLOW RATE SET POINT READING

The PC transmits: ADDR "B" <N> ETX <CC> EOT
<N> = set point number. (from "1" to "9" and from "A" to "F" for set points from 10 to 15)

The instrument responds: ADDR "B" <N> <XXXX> ETX <CC> EOT
<XXXX> = flow rate set point

C) SETPOINT SELECTION

The PC transmits: ADDR "C" <N> ETX <CC> EOT
<N> = set point number. (from "1" to "9" and from "A" to "F" for set points from 10 to 15)

The instrument responds: ADDR "C" ACK EOT

D) SET TOLERANCE PROGRAMMING

The PC transmits: ADDR "D" <XXXX> ETX <CC> EOT
<XXXX> = set tolerance without decimal point

The instrument responds: ADDR "D" ACK EOT

E) SET TOLERANCE READING

The PC transmits: ADDR "E" ETX <CC> EOT

The instrument responds: ADDR "E" <XXXX> ETX <CC> EOT
<XXXX> = set tolerance without decimal point

F) PROGRAMMING SET OF TOTAL DOSED, PRESET AND FLIGHT

The PC transmits: ADDR "F" <XXXXXXX> <PPPPPPP> <VVVVVVV> ETX <CC> EOT
<XXXXXXX> = total set point without decimal point
<PPPPPPP> = total preset without decimal point
<VVVVVVV> = total flight without decimal point

The instrument responds: ADDR "F" ACK EOT

G) READING OF TOTAL DOSED SET, PRESET AND FLIGHT

The PC transmits: ADDR "G" ETX <CC> EOT

The instrument responds: ADDR "G" <XXXXXXX> <PPPPPPP> <VVVVVVV> ETX <CC> EOT

<XXXXXXX> = total set point without decimal point

<PPPPPPP> = total preset without decimal point

<VVVVVVV> = total flight without decimal point

H) TOTAL DOSED RESET

PC transmits: ADDR "H" ETX <CC> EOT

Instrument responds: ADDR "H" ACK EOT

I) MANUAL / AUTOMATIC SELECTION

The PC transmits: ADDR "I" <N> <XXX> ETX <CC> EOT

<N> = ("A" = automatic, "M" = manual)

<XXX> = manual output value (from 0% to 100%)

- with <N> = "A" : <XXX> = "000"

- with <N> = "M" : <XXX> from 0 to 100 selects the instrument in manual mode with the manual analog output equal to <XXX>.

- with <N> = "M" : <XXX> greater than 100 selects in manual mode maintaining the analog ou tput already present.

The instrument responds: ADDR "I" ACK EOT

If it is impossible to select in manual mode (in case of external regulator) it responds with NAK.

J) PROGRAMMING REGULATION PARAMETERS

The PC transmits: ADDR "J" <PPP> <XX> <BBBB> ETX <CC> EOT

<PPP> = proportional constant from 0 to 250.

<XX> = '00'.

<BBBB> = absolute value of dead band.

The instrument responds: ADDR "J" ACK EOT

K) READING OF REGULATION PARAMETERS

The PC transmits: ADDR "K" ETX <CC> EOT

The instrument responds: ADDR "K" <PPP> <XX> <BBBB> ETX <CC> EOT

<PPP> = proportional constant from 0 to 250.

<XX> = '00'

<BBBB> = absolute value of dead band

L) READING INSTRUMENT STATUS

The PC transmits: ADDR "L" ETX <CC> EOT

The instrument responds: ADDR "L" <M> <F> <FFFF><PPPPPP><XXXXXXX> ETX <CC> EOT

<M> = (stop='0', start='1', dosing='2', refill='3', end of refill='4', volumetric block='5')

<F> = operating mode (A = automatic, M = manual)

<FFFF> = instantaneous flow rate

<PPPPPP> = current weight

<XXXXXXX> = partial total

M) PERCENTAGE CHANGE OF FLOW SET

The PC transmits: ADDR_0 "M" <XXXX> ETX <CC> EOT

This string must contain the address "0" to be recognized. The instrument does not respond with any string either in the case of a command executed or in the case of an error. The percentage value received is relative to the maximum flow rate value.

<XXXX> = percentage in thousandths of the maximum flow rate.

N) MIN AND MAX LEVELS PROGRAMMING

The PC transmits: ADDR "N" <XXXXXX> <YYYYYY> ETX <CC> EOT

<XXXXXX> = minimum level

<YYYYYY> = maximum level

The instrument responds: ADDR "N" ACK EOT

O) READING MIN AND MAX LEVELS

The PC transmits: ADDR "O" ETX <CC> EOT

The instrument responds: ADDR "O" <XXXXXX> <YYYYYY> ETX <CC> EOT

<XXXXXX> = minimum level

<YYYYYY> = maximum level

P) LINEARIZATION POINTS PROGRAMMING

The PC transmits: ADDR "P" <aaaa><bbbb><cccc><dddd><eeee><ffff><gggg> ETX <CC> EOT

<aaaa> = flow rate corresponding to 20% of the output.

<bbbb> = flow rate corresponding to 30% of the output.

<cccc> = flow rate corresponding to 40% of the output.

<dddd> = flow rate corresponding to 50% of the output.

<eeee> = flow rate corresponding to 60% of the output.

<ffff> = flow rate corresponding to 70% of the output.

<gggg> = flow rate corresponding to 80% of the output.

The tool responds: ADDR "P" ACK EOT

Q) READING LINEARIZATION POINTS

The PC transmits: ADDR "Q" ETX <CC> EOT

The instrument responds:

ADDR "Q" <aaaa><bbbb><cccc><dddd><eeee><ffff><gggg> ETX <CC> EOT

<aaaa> = flow rate corresponding to 20% of the output.

<bbbb> = flow rate corresponding to 30% of the output.

<cccc> = flow rate corresponding to 40% of the output.

<dddd> = flow rate corresponding to 50% of the output.

<eeee> = flow rate corresponding to 60% of the output.

<ffff> = flow rate corresponding to 70% of the output.

<gggg> = flow rate corresponding to 80% of the output.

R) MAX SYSTEM FLOW READING

The PC transmits: ADDR "R" ETX <CC> EOT

The instrument responds: ADDR "R" <XXXXXXX> ETX <CC> EOT

<XXXXXXX> = 7 characters of max. flow rate in kg/h

S) INSTANT ANALOG OUTPUT PERCENTAGE READING

The PC transmits: ADDR "S" ETX <CC> EOT

The instrument responds: ADDR "S" <XXX> ETX <CC> EOT

<XXX> = 3 characters of instantaneous analog output percentage

T) RESETTING LINEARIZATION POINTS

PC transmits: ADDR "T" ETX <CC> EOT

Instrument responds: ADDR "T" ACK EOT

U) PROGRAMMING SELECTION ADJUSTMENT

The PC transmits: ADDR "U" <X> ETX <CC> EOT

The instrument responds: ADDR "U" ACK EOT

<X> = 1 character for selecting the instantaneous analog output percentage (0=transmitter, 1=regulator).

V) READING SELECTION ADJUSTMENT

The PC transmits: ADDR "V" ETX <CC> EOT

The instrument responds: ADDR "V" <X> ETX <CC> EOT

<X> = 1 character for selecting the instantaneous analog output percentage (0=transmitter, 1=regulator).

8 - MODBUS RTU / MODBUS TCP TABLE

The following table lists the instrument registers that can be read or programmed via Modbus RTU or Modbus/TCP protocol. The supported functions are:

READ HOLDING REG

PRESET SINGLE REG

PRESET MULTIPLE REG

Registers are 16 bits in size.

Type R - Read registers.

Type W - Write registers.

WARNING: Once the parameters have been programmed, it is necessary to send the command '5'=save data in the command register in order to save the changes made in permanent memory, before turning off the instrument.

Address	Register	Type	Notes
40011	Setup - Operation	R/W	Transmitter / Controller
40013	Setup - Totalization	R/W	NO / YES
40014	Setup - Master Input	R/W	NO / SERIAL / ANALOG
40015	Setup - 2nd Analog Output	R/W	NO / YES
40016	Analog Input	R	YES
40017	USB Host	R	YES
40018	Technician - Language	R/W	ITA / ENG
40019	Setup - Analog Output Range 1	R/W	(0-10 / 0-5 / 0-20 / 4-20)
40020	Setup - Analog Output Range 2	R/W	(0-10 / 0-5 / 0-20 / 4-20)
40101	COM1 Protocol	R/W	
40102	COM1 Baud Rate	R/W	1200/2400/4800/9600/19200/38400/57600/115200
40103	COM1 Data Frame	R/W	
40104	COM2 Protocol	R/W	
40105	COM2 Baud Rate	R/W	1200/2400/4800/9600/19200/38400/57600/115200
40106	COM2 Data Frame	R/W	
40107	COM2 Protocol	R/W	
40108	COM1 Address	R/W	
40109	FIELDBUS Address	R/W	
40110	Fieldbus IP Address	R/W	MSW
40111	Fieldbus IP Address	R/W	LSW
40112	Fieldbus Subnet	R/W	
40113	Fieldbus Subnet	R/W	
40114	Not Used	R	0
40115	Fieldbus Input Area Size	R/W	(32/64/96/128)
40116	Fieldbus Output Area Size	R/W	(32/64/96/128)
40117	Not Used	R	0
40121	Touch Lock	R/W	(NO/YES)
40122	User Password	R/W	

40123	Setup Password	R/W	
40124	Technician Password	R/W	
40131	Cal.Dos-Flow Rate @ 20%	R/W	
40132	Cal.Dos-Flow Rate @ 30%	R/W	
40133	Cal.Dos-Flow Rate @ 40%	R/W	
40134	Cal.Dos-Flow Rate @ 50%	R/W	
40135	Cal.Dos-Flow Rate @ 60%	R/W	
40136	Cal.Dos-Flow @ 70%	R/W	
40137	Cal.Dos-Flow @ 80%	R/W	
40151	Technical - Max Flow	R/W	MSW
40152	Technical - Max Flow	R/W	LSW
40153	Technical - Load Cell Flow	R/W	MSW
40154	Technical - Load Cell Flow	R/W	LSW
40155	Technical - Minimum Level	R/W	MSW
40156	Technical - Minimum Level	R/W	LSW
40157	Technical - Maximum Level	R/W	MSW
40158	Technical - Maximum Level	R/W	LSW
40159	Technical - Load Cell Sensitivity	R/W	
40160	Technical - Cell Preload	R/W	
40161	Technical - Recharge Mode	R/W	(UNIQUE / MAX LEVEL / AUTO)
40162	Total Unit Decimals	R/W	
40163	Dead Band Units	R/W	(kg(t)-h / %)
40164	Tolerance Units	R/W	(kg(t)-h / %)
40165	Filter - Negative Flow	R/W	
40501	Data Register	R/W	MSW
40502	Data Register	R/W	LSW (command register data)
40503	Command Register	R/W	(1=tot reset, 2=auto/man, 3=man output set, 4=set select, 5=save data)
41001	Sampling Time	R/W	
41002	Proportional Constant	R/W	(NO / YES)
41003	Flow Sensitivity	R/W	(N.O. / N.C.)
41004	Dead Band in kg(t)/h	R/W	(N.O. / N.C.)
41005	Tolerance in kg(t)/h	R/W	(Set Select / Reload)
41006	Dead Band in %	R/W	(Set Select / Total Reset)
41007	Tolerance in %	R/W	0
41008	Delta Flow	R/W	0
41009	Minimum Control Output	R/W	0
41010	Maximum Control Output	R/W	0
41021	Total Pulse Value	R/W	0
41022	Recharge Alarm	R/W	0
41023	Logic Output Alarm	R/W	MSW
41024	Tolerance Output Logic	R/W	LSW
41025	Function In.5	R/W	MSW
41026	Function In.6	R/W	LSW

41027	Disable Tolerance Alarm	R	MSW
41028	Disable Tolerance Alarm All. Regulation	R	LSW
41029	Permanent alarm activation	R	
41041	Start delay	R/W	MSW
41042	Stop delay	R/W	LSW
41043	Recharge timeout	R/W	MSW
41044	Tolerance delay	R/W	LSW
41045	Start tolerance delay	R/W	
41061	Flow filter	R/W	MSW
41062	Weight filter	R/W	LSW
41063	Minimum flow	R/W	
41064	Minimum regulation output	R/W	0
41065	Setpoint filter	R	
41066	Weight filter averages	R	(1=total reset, 2=auto/man, 3=manual output set, 4=set select, 5=save data)
41067	Weight OLS period	R	(bit 15 priority, bit 0 input status)
42001	Total Set	R/W	(bit 15 priority, bit 0 input status)
42002	Total Set	R/W	LSW
42003	Total Preset	R/W	MSW
42004	Total Preset	R/W	LSW
42005	Total Queue	R/W	MSW
42006	Total Queue	R/W	LSW
42041	Setpoint 1	R/W	
42042	Manual output setpoint 1	R/W	
42043	Setpoint 2	R/W	
42044	Manual output setpoint 2	R/W	
42045	Setpoint 3	R/W	
42046	Manual output setpoint 3	R/W	
42047	Setpoint 4	R/W	
42048	Manual output setpoint 4	R/W	
42049	Setpoint 5	R/W	
42050	Manual output setpoint 5	R/W	
42051	Setpoint 6	R/W	
42052	Manual output setpoint 6	R/W	
42053	Setpoint 7	R/W	
42054	Manual output setpoint 7	R/W	
42055	Setpoint 8	R/W	
42056	Manual output setpoint 8	R/W	
42057	Setpoint 9	R/W	
42058	Manual output setpoint 9	R/W	
42059	Setpoint 10	R/W	
42060	Manual output setpoint 10	R/W	
42061	Setpoint 11	R/W	
42062	Manual output setpoint 11	R/W	

42063	Setpoint 12	R/W	
42064	Manual output setpoint 12	R/W	
42065	Setpoint 13	R/W	
42066	Manual output setpoint 13	R/W	
42067	Setpoint 14	R/W	
42068	Manual output setpoint 14	R/W	
42069	Setpoint 15	R/W	
42070	Manual output setpoint 15	R/W	
43011	Hourly flow rate	R	
43012	Total	R	MSW
43013	Total	R	LSW
43014	Grand Total	R	MSW
43015	Grand Total	R	LSW
43016	Active setpoint value	R	
43017	Alarm code	R	
43018	Logic inputs	R	
43019	Logic outputs	R	
43020	Flow rate full scale	R	
43021	Weight dosed in the sampling period	R	
43022	Weight	R	MSW
43023	Weight	R	LSW
43024	Analog output 1 (%)	R	
43025	Analog output 2 (%)	R	
43026	Analog input value	R	
43027	Doser status	R	
43028	Dosing status	R	
43029	Hourly flow rate decimals	R	
43030	Total value decimals	R	
43031	Weight value decimals	R	
43032	System ready	R	0
44011	Selected set number	R/W	
44012	Manual / automatic selection	R/W	
44013	Manual percentage output	R/W	
44014	Ext module input status 1	R/W	
44015	Module output status ext 1	R/W	
44016	Ext 2 module input status	R/W	
44017	Ext 2 module output status	R/W	
45001	Command register	R/W	(1=reset tot, 2=auto/man, 3=set uscita man, 4=sel set, 5=salva dati)
45002	Start input command and priority	R/W	(bit 15 priorità, bit 0 stato ingresso)
45003	Recharge input command and priority	R/W	(bit 15 priorità, bit 0 stato ingresso)
47001	Test register	R/W	

8.1 - MASTER / SLAVE PROTOCOL

The instrument can be configured to work as a master of other instruments or as a slave of it. In the first case the percentage of hourly flow detected with respect to the full scale is continuously transmitted to the slaves, which adjust the flow setpoint to the percentage received.

This function can be achieved with a serial connection Rs485. The communication string is sent at a frequency of 10 Hz, using the parameters programmed for the port used.

STX	"M"	XXXXXX.X	ETX	CC	EOT

XXXXXX.X (8 chars): Flow rate percentage value with 1 decimal place.
CC (2 chars): Control checksum.

A repeater (RIPH20, RIPH60, RIPH100, RIPH160) can be connected in parallel to the slaves to display the transmitted value.

8.2 - PROFINET - ETHERNET/IP

The management of fieldbus protocols takes place via dedicated interfaces (hardware modules mounted internally).

FIELDBUS INTERFACE MANAGEMENT

- Communication between the instrument and the fieldbus interface occurs via Modbus RTU serial protocol.
- The communication baud rate is fixed (115200 bits/sec).
- The timeout on the module response is controlled (300 ms).

ERROR HANDLING

- [FIELDBUS ERROR] Modbus communication failure with the fieldbus interface: following consecutive communication timeouts (20 seconds). An attempt to restore communication is automatically performed; if this also fails, the error is displayed and it is possible to manually attempt to restore by pressing the message.
- [NO COM FIELDBUS] Fieldbus network error off-line: for example, if the interface fails to connect to the network. This error is automatically silenced when normal connection is restored.
- [ERR CRC F-BUS] CRC error in Modbus communication.

PROFINET HILSCHER X90

XML config file: GSDML-V2.35-HILSCHER-NETX 90-RE-PNS-32byte-M-20200507.xml.

Input area size: selectable (32, 64, 96 or 128 bytes).

Output area size: selectable (32, 64, 96 or 128 bytes).

Communication address: not programmable from the instrument.

The instruments are supplied with the "Profinet Name" parameter not configured and with an IP address equal to 0.0.0.0.

ETHERNET/IP HILSCHER X90

EDS config file:

- HILSCHER NETX90 EIS V5-32.EDS (input area 32 byte, output area 32 byte).
- HILSCHER NETX90 EIS V5-64.EDS (input area 64 byte, output area 64 byte).
- HILSCHER NETX90 EIS V5-96.EDS (input area 96 byte, output area 96 byte).
- HILSCHER NETX90 EIS V5-128.EDS (input area 128 byte, output area 128 byte).

Input area size: selectable (32, 64, 96 or 128 bytes).

Output area size: selectable (32, 64, 96 or 128 bytes).

Communication address: IP address and subnet mask programmable from the instrument.

The instruments are supplied with an IP address of 10.0.0.201. The size of the input and output areas set in the PLC must match the size of the input and output areas in the instrument

8.3 - INPUT DATA AREA

- Data produced by the instrument and master read

Input area size: selectable (32, 64, 96 or 128 bytes).
Single register size: 16 bits.
Register update rate: 100 Hz.

- Data written by the master and acquired by the instrument

Output area size: selectable (32, 64, 96 or 128 bytes).
Single register size: 16 bits.
Register acquisition rate: 100 Hz.

8.4 - INPUT DATA AREA TABLE

Address ref.	Variables	Byte Mapping
3011	Instantaneous hourly flow rate	0-1
3022	Current weight (MSW)	2-3
3023	Current weight (LSW)	4-5
3012	Total dosed (MSW)	6-7
3013	Total dosed (LSW)	8-9
3027	Instrument status	10-11
3028	Dosing status	12-13
4012	AUTO / MAN operation	14-15
4013	Manual output value	16-17
3017	Alarm code	18-19
4011	Active setpoint number	20-21
3016	Active setpoint value	22-23
3018	Logic inputs status	24-25
3019	Logic outputs status	26-27
3024	Analog output value	28-29
7001	Monitor register	30-31
3014	Grand total (MSW)	32-33
3015	Grand total (LSW)	34-35
3021	Weight dosed in the sampling period	36-37
3020	Maximum hourly flow rate	38-39
2001	Set total (MSW)	40-41

2002	Total Set (LSW)	42-43
2003	Total Preset (MSW)	44-45
2004	Total Preset (LSW)	46-47
2005	Total Queue (MSW)	48-49
2006	Total Queue (LSW)	50-51
1021	Total Pulse Value	52-53
1005	Setpoint Tolerance	54-55
1044	Tolerance Alarm Delay	56-57
3029	Hourly Flow Decimals	58-59
3031	Weight Decimals	60-61
3030	Total Decimals	62-63
2041	Setpoint 1	64-65
2042	Output Relative to Setpoint 1	66-67
2043	Setpoint 2	68-69
2044	Output Relative to Setpoint 2	70-71
2045	Setpoint 3	72-73
2046	Output Relative to Setpoint 3	74-75
2047	Setpoint 4	76-77
2048	Output Relative to Setpoint 4	78-79
2049	Setpoint 5	80-81
2050	Output Relative to Setpoint 5	82-83
2051	Setpoint 6	84-85
2052	Output Relative to Setpoint 6	86-87
2053	Setpoint 7	88-89
2054	Output Relative to Setpoint 7	90-91
2055	Setpoint 8	92-93
2056	Output Relative to Setpoint 8	94-95
0151	Maximum System Flow Rate (MSW)	96-97
0152	Maximum System Flow Rate (LSW)	98-99
0153	Load Cell Flow Rate (MSW)	100-101
0154	Load Cell Flow Rate (LSW)	102-103
0155	Minimum Weight Level (MSW)	104-105
0156	Minimum Weight Level (LSW)	106-107
0157	Maximum Weight Level (MSW)	108-109
0158	Maximum Weight Level (LSW)	110-111
0160	System Tare	112-113

8.5 - OUTPUT DATA AREA TABLE

Address ref.	Variables	Byte Mapping
503	Command Register	0-1
501	Data Register (MSW)	2-3
502	Data Register (LSW)	4-5
7001	Monitor Register	6-7
4012	AUTO / MAN Operation	8-9
4013	Manual Output Value	10-11
4011	Active Setpoint Number	12-13
2001	Total Set (MSW)	14-15
2002	Total Set (LSW)	16-17
2003	Total Preset (MSW)	18-19
2004	Total Preset (LSW)	20-21
2005	Total Queue (MSW)	22-23
2006	Total Queue (LSW)	24-25
1021	Total Pulse Value	26-27
1005	Setpoint Tolerance	28-29
1044	Tolerance Alarm Delay	30-31
2041	Setpoint 1	32-33
2042	Output Relative to Setpoint 1	34-35
2043	Setpoint 2	36-37
2044	Output Relative to Setpoint 2	38-39
2045	Setpoint 3	40-41
2046	Output Relative to Setpoint 3	42-43
2047	Setpoint 4	44-45
2048	Output Relative to Setpoint 4	46-47
2049	Setpoint 5	48-49
2050	Output Relative to Setpoint 5	50-51
2051	Setpoint 6	52-53
2052	Output Relative to Setpoint 6	54-55
2053	Setpoint 7	56-57
2054	Output Relative to Setpoint 7	58-59
2055	Setpoint 8	60-61

2056	Output relative to Setpoint 8	62-63
0151	Maximum system flow rate (MSW)	64-65
0152	Maximum system flow rate (LSW)	66-67
0153	Load cell flow rate (MSW)	68-69
0154	Load cell flow rate (LSW)	70-71
0155	Minimum weight level (MSW)	72-73
0156	Minimum weight level (LSW)	74-75
0157	Maximum weight level (MSW)	76-77
0158	Maximum weight level (LSW)	78-79
0160	System tare	80-81
1001	Sampling time	82-83
1002	Proportional constant	84-85
1003	Flow rate sensitivity	86-87
1004	Dead band	88-89
1061	Hourly flow filter	90-91
1062	Weight filter	92-93
1063	Minimum flow rate	94-95

COMMAND REGISTER / DATA REGISTER

Command register value	Data register value	Description
1	-	Clear total
2	0-1	Switch AUTO / MAN operation
3	0-1000	Set manual output value (0.0 % to 100.0 %)
4	1-15	Select setpoint
5	-	Store data
0x3FFF	-	Read output data area

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